HP ProLiant DL585 Server Maintenance and Service Guide

July 2004 (Second Edition)
Part Number 358708-002

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About This Guide

This maintenance and service guide can be used for reference when servicing the HP ProLiant DL585 server.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Audience Assumptions

This guide is for service technicians. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazard in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

Technician Notes

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in.) of clearance at the front and back of the server.

CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- *Service Quick Reference Guide*
- Service training guides
- Service advisories and bulletins
- QuickFind information services
- Insight Manager software

Integrated Management Log

The server includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Insight Manager.

Telephone Numbers

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to

  www.hp.com

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Illustrated Parts Catalog

Mechanical Components Exploded View

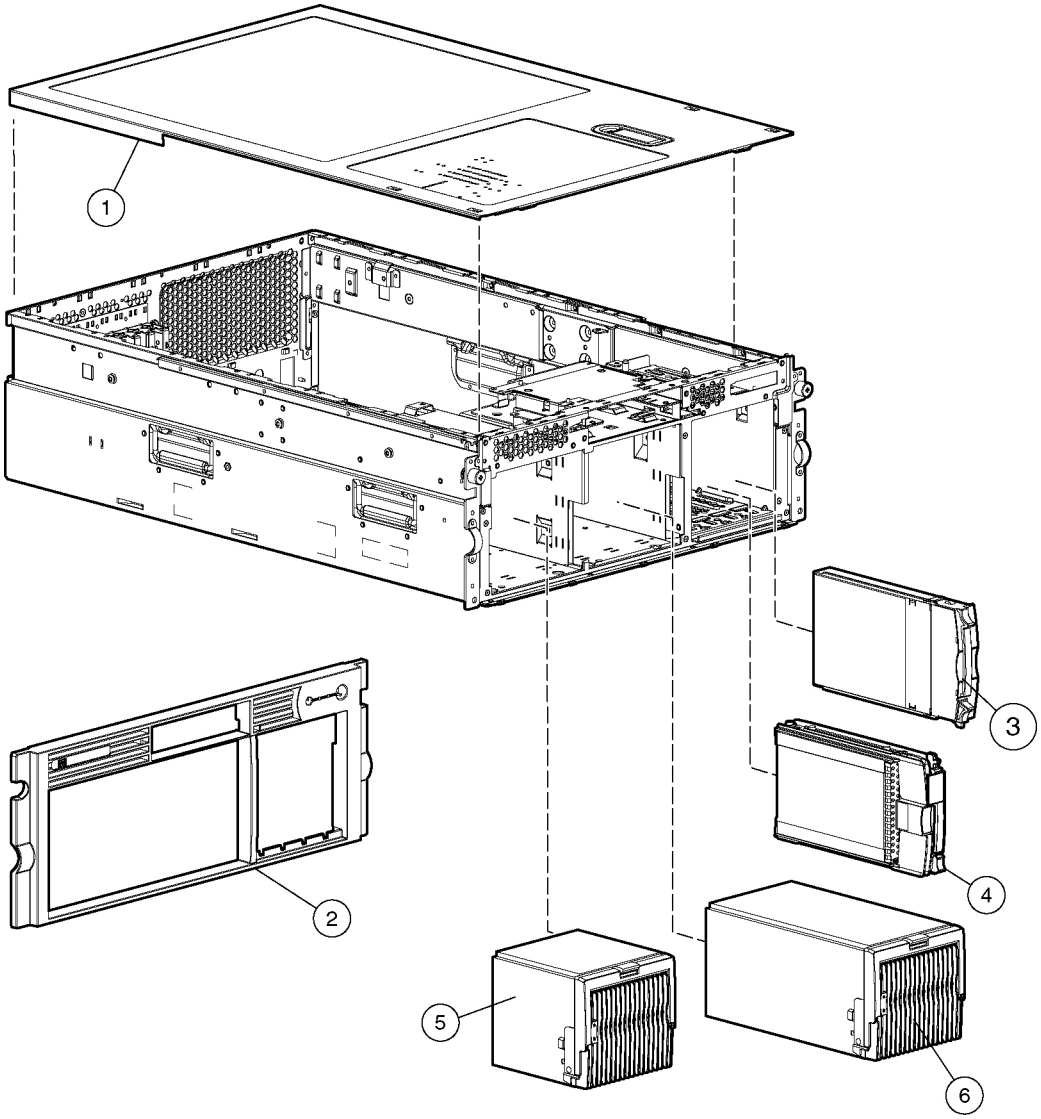

Figure 1-1: Mechanical components exploded view

Mechanical Components Spare Parts List

Table 1-1: Mechanical Components Spare Parts List

Item	Description	Spare Part Number
1	Access panel	359772-001
2	Front bezel	243669-001
3	SCSI hard drive blank	122759-001
4	SCSI hard drive	
4a	18.2-GB SCSI hard drive, U320 15K*	289240-001
4b	36.4-GB SCSI hard drive, U320 10K*	289041-001
4c	36.4-GB SCSI hard drive, U320 15K*	289241-001
4d	72.8-GB SCSI hard drive, U320 10K*	289042-001
4e	72.8-GB SCSI hard drive, U320 15K*	289243-001
4f	145.6-GB SCSI hard drive, U320 10K*	289044-001
5	Power supply blank	267133-001
6	Power supply, 800 W, hot-plug	192201-001
7	Cable management arm*	295792-001
8	Power cord retainer kit*	313825-001
* Not shown		

System Components Exploded View

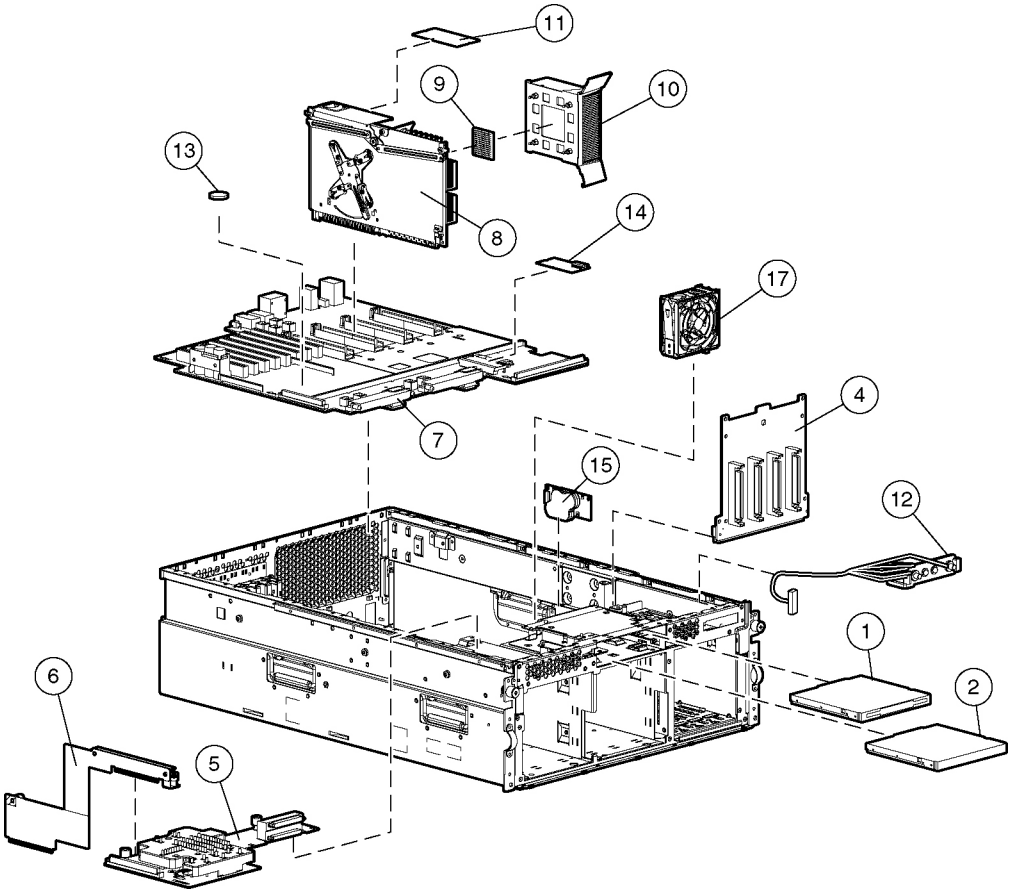

Figure 1-2: System components exploded view

System Components Spare Parts List

Table 1-2: System Components Spare Parts List

Item	Description	Spare Part Number
	Media Storage Devices	
1	Diskette drive, 12.7 mm, universal media (optional)	267132-001
2	CD-ROM drive, 24X, universal media	228508-001
3	DVD-ROM drive, 8X, universal media (optional)*	268795-001
	Boards	
4	SCSI backplane	231128-001
5	Diagnostic display board and lightpipe	356784-001
6	Pass-through board	249106-001
7	System board	356782-001
8	Processors Memory Boards **IMPORTANT**: Mixing processor speeds and cache sizes is not supported.	356783-001
9a	Processor, 1.6 GHz	359769-001
9b	Processor, 1.8 GHz	359770-001
9c	Processor, 2.2 GHz	359771-001
9d	Processor, 2.4 GHz	371755-001
	Reserved	
	Reserved	
10	Heatsink	359774-001
11	Processor power module (PPM)	365873-001
12	Power switch assembly	243670-001
13	Battery, system, 3 V	153099-001

* Not shown

continued

Table 1-2: System Components Spare Parts List *continued*

Item	Description	Spare Part Number
14	5i Plus memory module	260741-001
15	Battery-Backed Write Cache Module, 4.8 V	260740-001
16*	Battery-Backed Write Cache Module Cable	283033-001
17	Fan assembly, hot-plug, 92 x 38 mm	359773-001
18	Fan cage cable assembly*	361442-001
19	Plastics kit* a) Processor memory board air baffle b) Chassis air baffle, lower c) Chassis air baffle, upper	359768-001
20	AC power cord, 15 A, 125 V*	237457-001
21	AC power cord, 20 A, 250 V*	237458-001
22	AC power cord, 16A, C19-C20*	295508-001
23	AC power cord, 10A, C14-C19 IEC*	311582-001
24	Rack-mounting hardware kit (square-hole rack)*	313215-001
25	Rack-mounting hardware kit (round-hole rack)* optional	291895-001
26	Cable kit, AC filter cable assembly*	243671-001
27	Torx screwdriver, T-15*	199630-001
28	Documentation kit*	360428-001
29	Return kit*	279645-001
	Memory	
30	512-MB, PC2100 (DDR SDRAM)*	300700-001
31	1-GB, PC2100 (DDR SDRAM)*	300701-001
32	2-GB, PC2100 (DDR SDRAM)*	300702-001

* Not shown

2

Removal and Replacement Procedures

You need the following items for some procedures:

- Torx T-15 tool
- Flathead screwdriver
- Diagnostics Utility on the HP SmartStart CD

Safety Considerations

Before performing service procedures, review the following safety information.

Electrostatic Discharge

A discharge of static electricity can damage static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Be sure that you are properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Use nonconductive field service tools.

Server Warnings and Cautions

WARNING: Do not exceed the level of repair specified in the procedures in the product documentation. All troubleshooting and repair procedures are detailed to allow only subassembly or module-level repair. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Do not disable the AC power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**
- **Unplug the power cord from each power supply to disconnect power to the equipment.**

WARNING: To reduce the risk of personal injury from hot surfaces, allow the hot-plug drives and the internal system components to cool before touching.

CAUTION: Do not operate the server for extended periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

Preparation Procedures

To access some components and perform certain service procedures, you must do one or more of the following:

- Extend the server from the rack.

  If you are performing service procedures in an HP, Compaq branded, or third-party rack cabinet, you can use the locking feature of the rack rails to support the server and gain access to internal components.

  For more information about telco rack solutions, refer to the RackSolutions.com website:

  www.racksolutions.com/hp

- Access internal components.

  If you need to access internal components for removal or replacement, you can remove the access panel without removing the server from the rack.

- Power down the server.

NOTE: Do not power down the server if you are performing a hot-plug procedure.

- Remove the server from the rack.

  If the rack environment, cabling configuration, or the server location in the rack creates awkward conditions, remove the server from the rack.

WARNING: Before lifting the server, remove all hot-plug power supplies and hard drives to reduce the weight.

Powering Down the Server

WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

IMPORTANT: If installing a hot-plug device, it is not necessary to power down the server.

1. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.
3. If the server is installed in a rack, press the UID LED button (1) on the front panel. Blue LEDs illuminate on the front and rear of the server.
4. Press the Power On/Standby button (2) to place the server in standby mode. When the server activates standby power mode, the system power LED changes to amber.

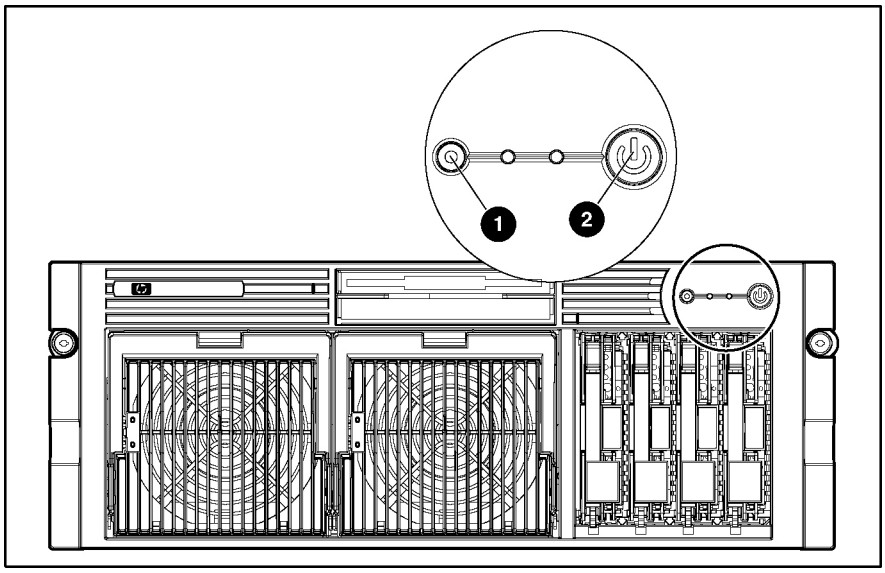

Figure 2-1: Identifying the UID LED (1) and Power On/Standby buttons (2)

5. If the server is installed in a rack, locate the server by identifying the illuminated rear UID LED button.
6. Disconnect the power cords.

The system is now without power.

Locating and Removing the Torx T-15 Tool

Many hardware procedures in the server are toolless, but a few require the removal of Torx T-15 screws that have been installed for shipping or security reasons. A Torx T-15 tool ships with the server for the removal of these screws.

1. Locate the Torx T-15 tool on the back of the server.
2. Slide the tool upward out of the retaining clips.

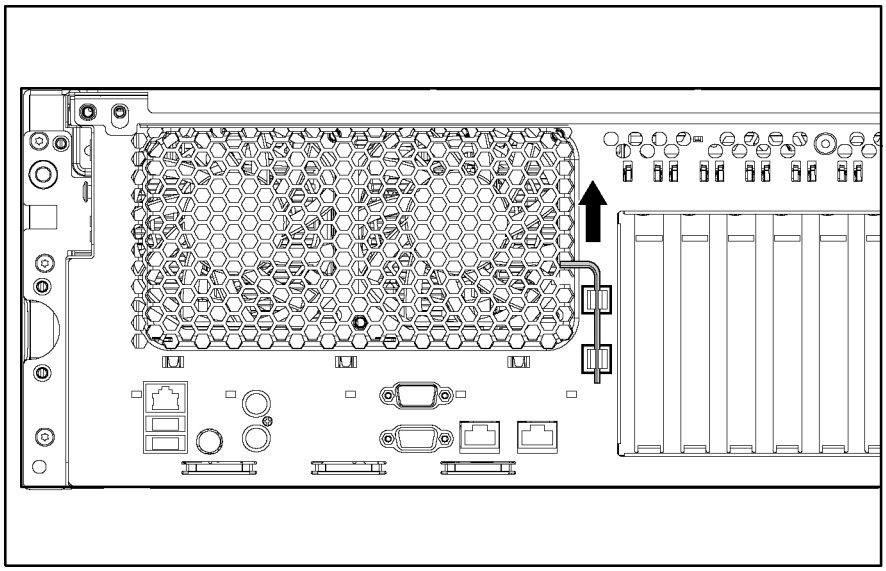

Figure 2-2: Removing the Torx T-15 tool

Extending the Server from the Rack

1. Loosen the thumbscrews that secure the server to the front of the rack.

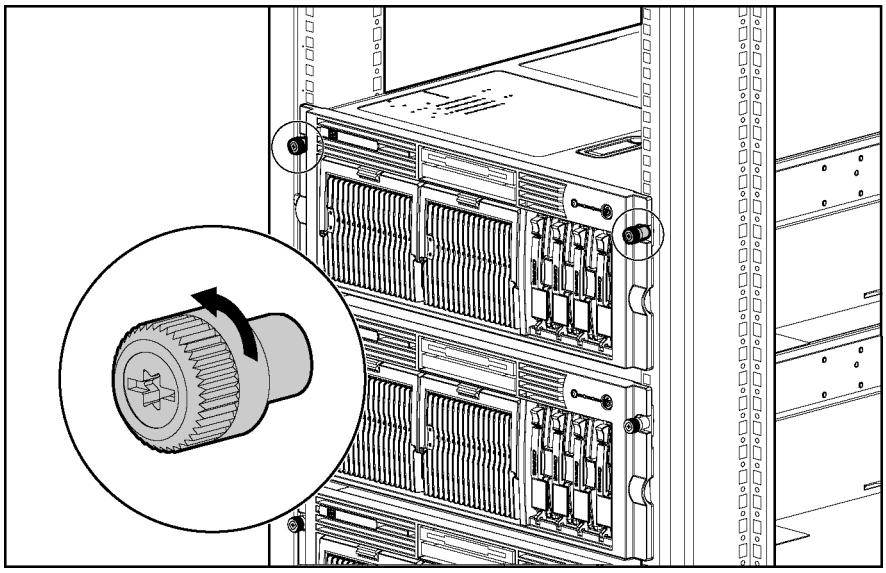

Figure 2-3: Loosening the front panel thumbscrews

2. Extend the server on the rack rails until the server rail-release latches engage.

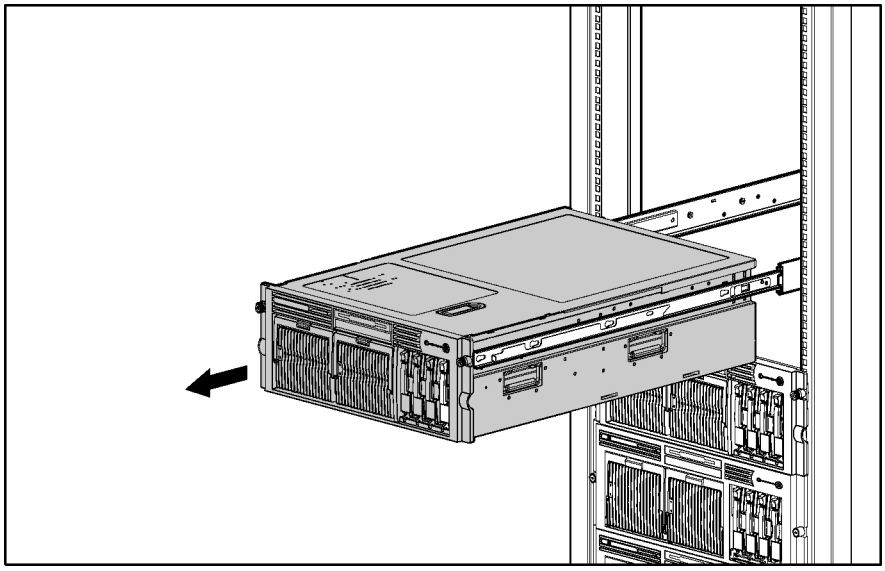

Figure 2-4: Extending the server from the rack

WARNING: Be careful when pressing the rail-release levers and sliding the component into or out of the rack. The sliding rails could pinch your fingertips.

3. After performing the installation or maintenance procedure, press the rail-release levers at the front of both server rails and slide the server into the rack.

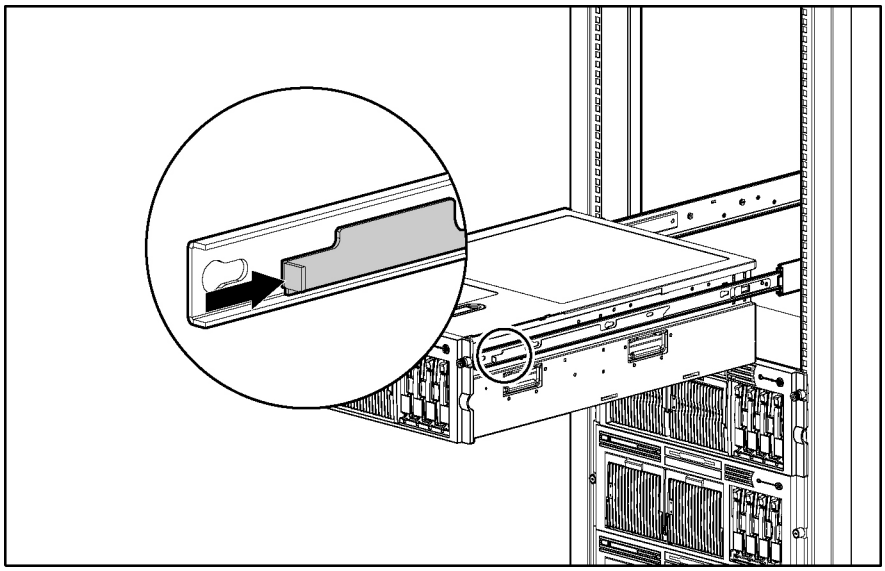

Figure 2-5: Sliding the server into the rack

4. Secure the server by tightening the thumbscrews.

Removing the Access Panel

WARNING: Pressing the Power On/Standby button sets the server to the standby position, which removes power from most areas of the server. However, portions of the power supply and some internal circuitry remain active until the AC power cord is removed.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

CAUTION: Electrostatic discharge can damage electronic components. Properly ground yourself before beginning any installation procedure.

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
3. Unlock the access panel latch (1).
4. Lift up on the latch (2) and remove the access panel (3).

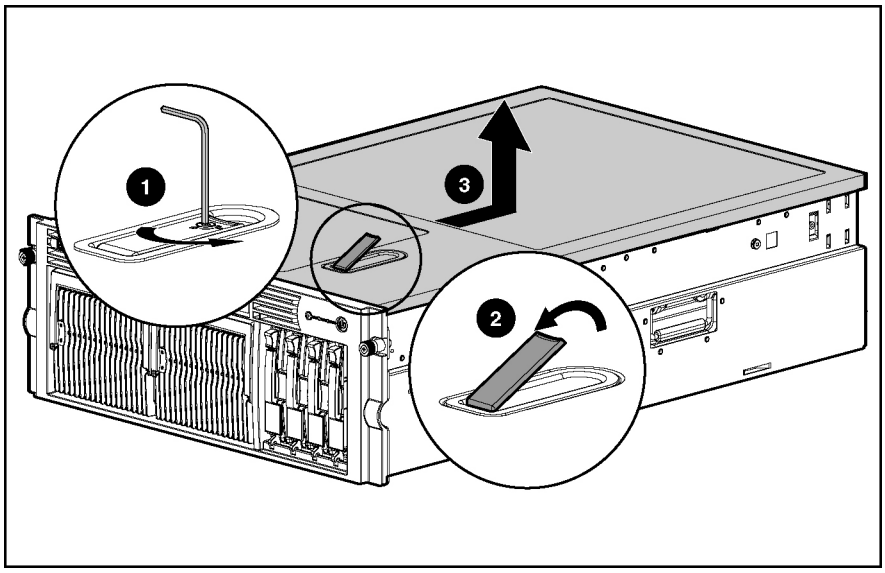

Figure 2-6: Removing the access panel

Installing the Access Panel

1. Place the access panel on top of the server with the latch open. Allow the panel to extend past the rear of the server approximately 1.25 cm (0.5 in).
2. Push down on the latch. The access panel slides to a closed position.

Removing the Server from the Rack

WARNING: The server is very heavy, up to 44.5 kg (98 lb). To reduce the risk of personal injury or damage to the equipment:

- **Remove all hot-plug power supplies to reduce the weight of the server before lifting it.**
- **Observe local occupational health and safety requirements and guidelines for material handling.**
- **Get help to lift and maneuver the server.**

To remove the server from the rack:

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
3. Unplug the cables from the rear of the server.
4. Press the rail release levers on the rails and slide the server off the rack rails.

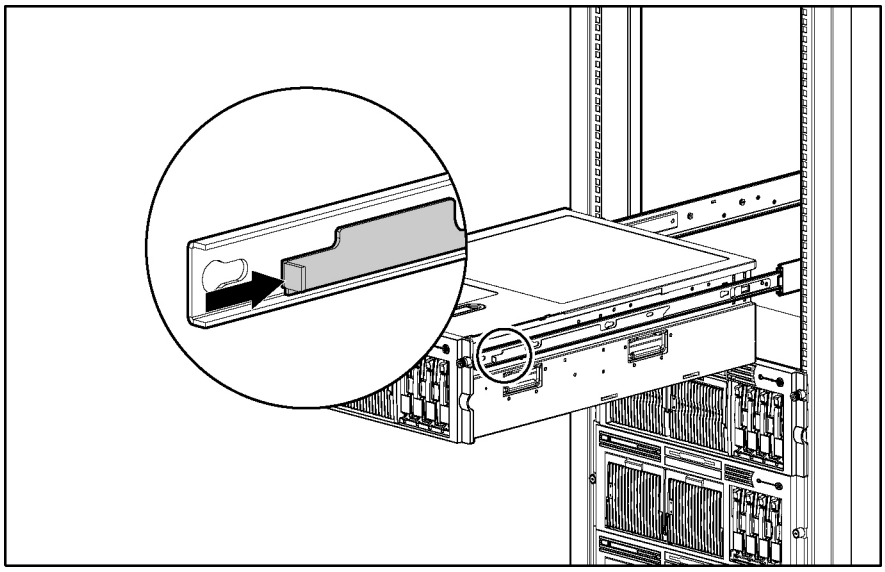

Figure 2-7: Removing the server from the rack

5. Place the server on a sturdy, level surface.

Reverse steps to install the server into the rack.

Processor Memory Boards

The server supports up to four processor memory boards with AMD Opteron processors.

CAUTION: Processor memory boards 1and 2 must always be installed. The system will not boot if either board is missing.

CAUTION: Update the ROM to be sure that the system ROM recognizes the new processor you are installing. For the most recent ROMPaq, refer to the HP website and follow the support link on the product website.

Failure to flash the ROM before installing processor memory boards can cause system failure.

IMPORTANT: Mixing processor speeds and cache sizes is not supported.

Processor Memory Board Population Guidelines

- All processors must be of the same speed and cache size.
- Processor memory boards 1 and 2 must always be installed.
- Processor memory boards 3 and 4 must be installed as a pair.

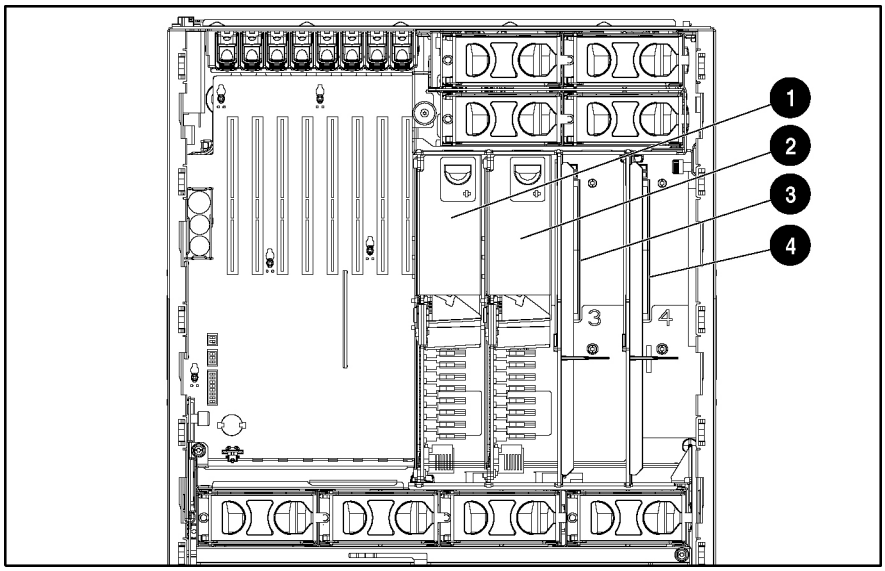

Figure 2-8: Locating the processor memory boards

Table 2-1: Processor Memory Boards

Item	Description
1	Processor memory board slot 1 (processor)
2	Processor memory board slot 2 (boot processor)
3	Processor memory board slot 3 (air baffle)
4	Processor memory board slot 4 (air baffle)

To remove a processor memory board:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory board.

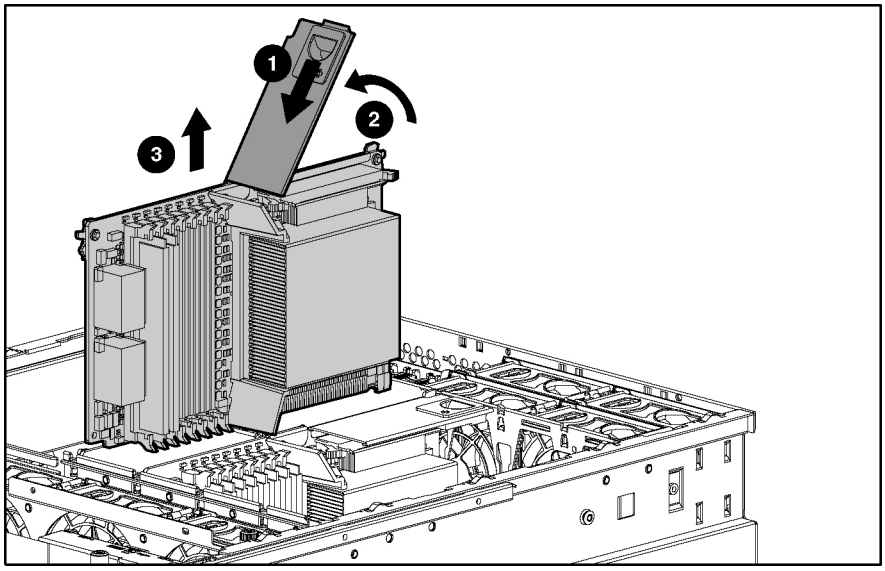

Figure 2-9: Removing a processor memory board

Reverse the steps to install a processor memory board.

Processor Power Module (PPM)

To remove a processor power module:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory board. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the PPM from the processor memory board.

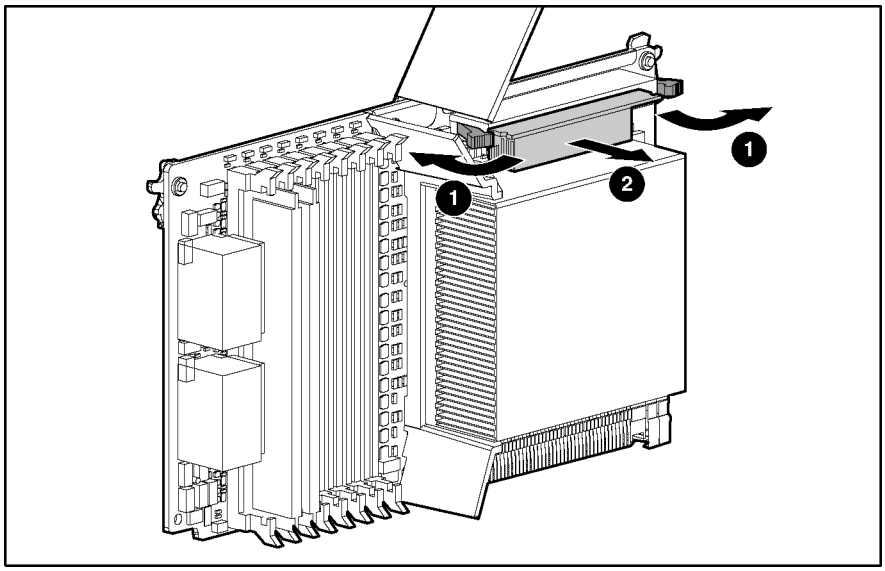

Figure 2-10: Removing a PPM

Reverse the steps to install a PPM.

Processor

To remove a processor:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory board. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the processor heatsink.

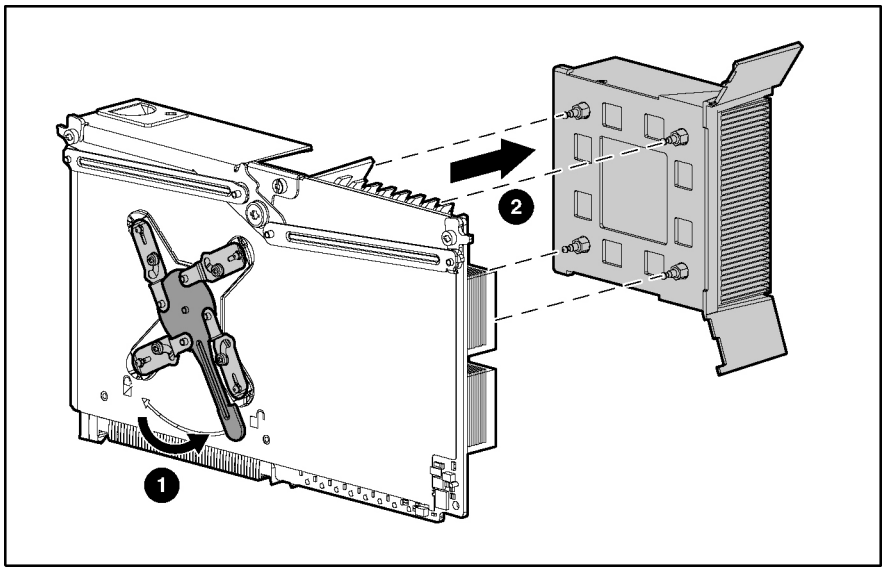

Figure 2-11: Removing the processor heatsink

6. Remove the processor.

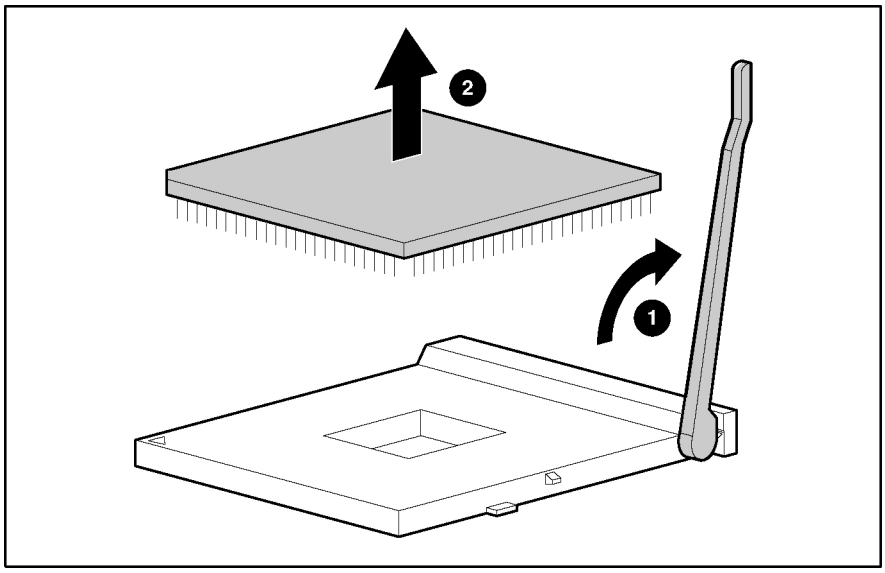

Figure 2-12: Removing a processor

IMPORTANT: Align the processor to the socket before installing it.

Reverse the steps to install a processor.

Memory Options

Minimum Memory Requirements

- Two DIMMs must be installed in bank 1 on the processor memory board in slot two.
- All DIMMs on a processor memory board must have the same part number.

NOTE: Processor memory boards in slots 1, 3, and 4 may be installed without memory.

Memory Population Guidelines

Supported configurations:

- DIMMs on different processor memory boards can be of different sizes, but DIMMs on the same processor memory board must be of the same size and have the same part number.
- DIMMs must be installed on a processor memory board in pairs and in bank order.

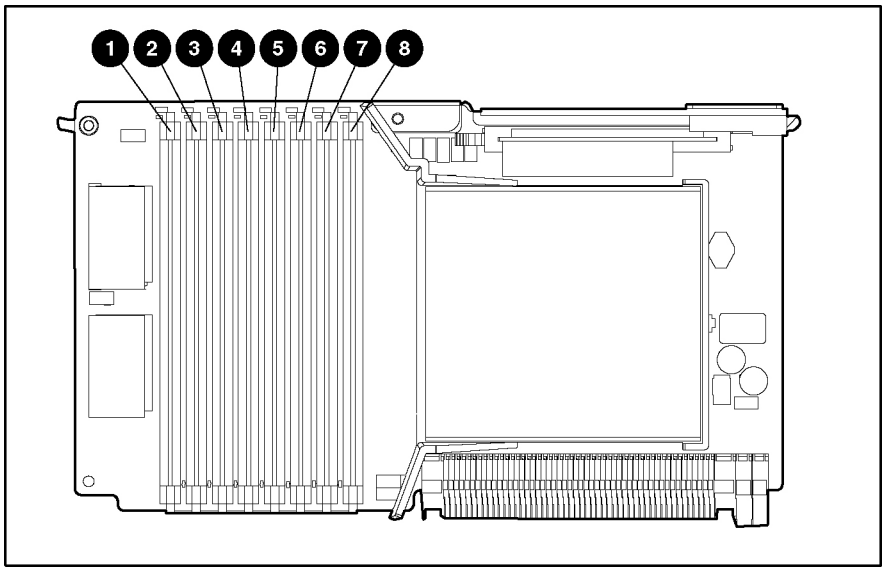

Figure 2-13: DIMM slots

Table 2-2: Processor Memory Board Memory Banks

Slot	Bank
1 - 2	Bank 1
3 - 4	Bank 2
5 - 6	Bank 3
7 - 8	Bank 4

To remove a DIMM:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory board. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the DIMM.

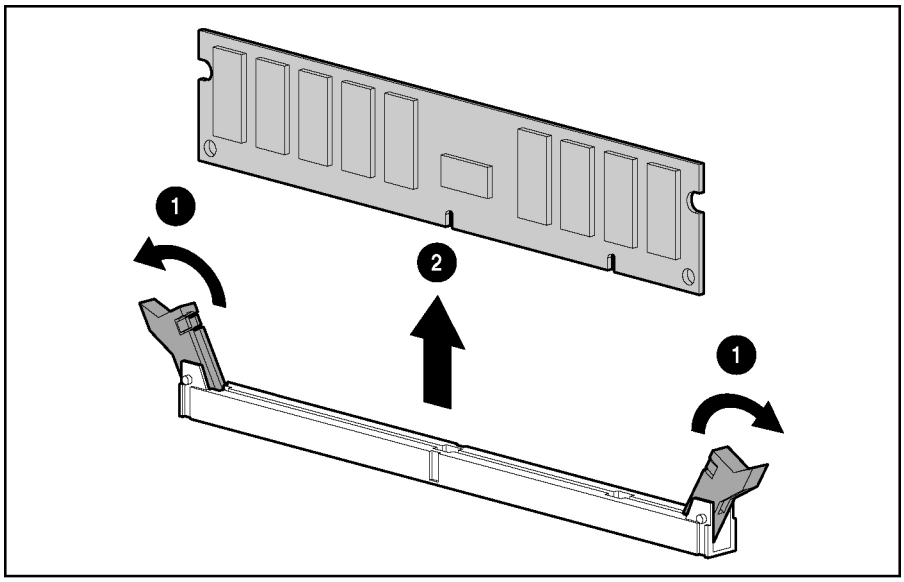

Figure 2-14: Removing a DIMM

IMPORTANT: Be sure all DIMM retention clips are in the closed/locked position before reinstalling processor memory board into the system.

Reverse steps to install a DIMM.

Hard Drive Blanks

To remove a hard drive blank:

1. Push the sliding release button to unlock the blank (1).
2. Pull the drive blank out of the drive cage (2).

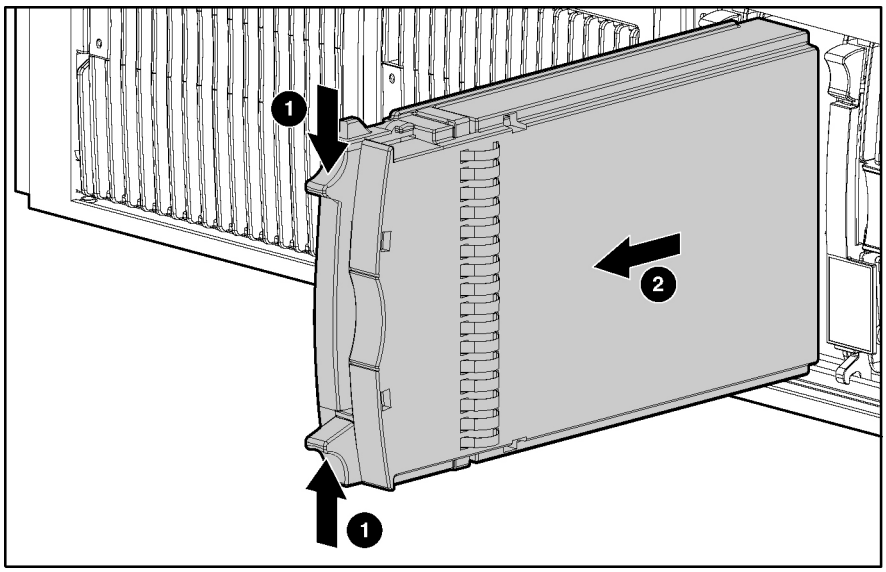

Figure 2-15: Removing a drive blank

NOTE: Keep the blank for future use.

Reverse the steps to replace a drive blank.

Hot-Plug SCSI Hard Drives

Drive Replacement Precautions

Be aware of the following guidelines cautioning unsafe hot-plug replacement.

- Do not remove a degraded drive if any other member of the array is offline (the online LED is off). No other drive in the array is hot-pluggable without data loss. The exception to this is the use of RAID 1+0 as a fault-tolerant configuration. In this case, drives are mirrored in pairs. More than one drive can fail and be replaced as long as the drive or drives they are mirroring are online.
- Do not remove a degraded drive if any member of an array is missing (removed previously and not yet replaced).
- Do not remove a degraded drive if any member of an array is being rebuilt, unless the drive being rebuilt has been configured as an online spare. The online LED for the drive flashes green or amber, indicating that a replaced drive is being rebuilt from the data stored on the other drives.

  NOTE: An online spare drive does not activate and start rebuilding after a predictive failure alert because the degraded drive is still online. The online spare activates only after a drive in the array has failed.

- Do not replace multiple degraded drives at the same time, since the fault tolerance can be compromised. When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive or drives, and permanent data loss can occur.

CAUTION: Do not turn off any external unit when the server containing. A Smart Array controller is powered up. Also, do not power up the server before powering up the drive enclosure. If these ordering rules are not followed, the Smart Array controller may mark the drives in this enclosure as **failed**, resulting in permanent data loss.

To remove a non-functioning hot-plug SCSI hard drive:

CAUTION: Remove or replace a hard drive only when the drive failure LED is amber. Data loss can occur if a drive is removed when the drive online LED is green. Refer to "Hot-Plug SCSI Hard Drive LEDs" in Chapter 4, "Server Component Identification," for more information.

CAUTION: Remove or replace only one hard drive at a time. The controller relies on other drives to reconstruct data on the replaced drive. Drive reconstruction is active when the drive online LED is flashing green.

1. Press the release button to unlock the ejector lever on the hard drive (1).
2. Open the ejector lever to release the drive (2).
3. Slide the drive out of the cage (3).

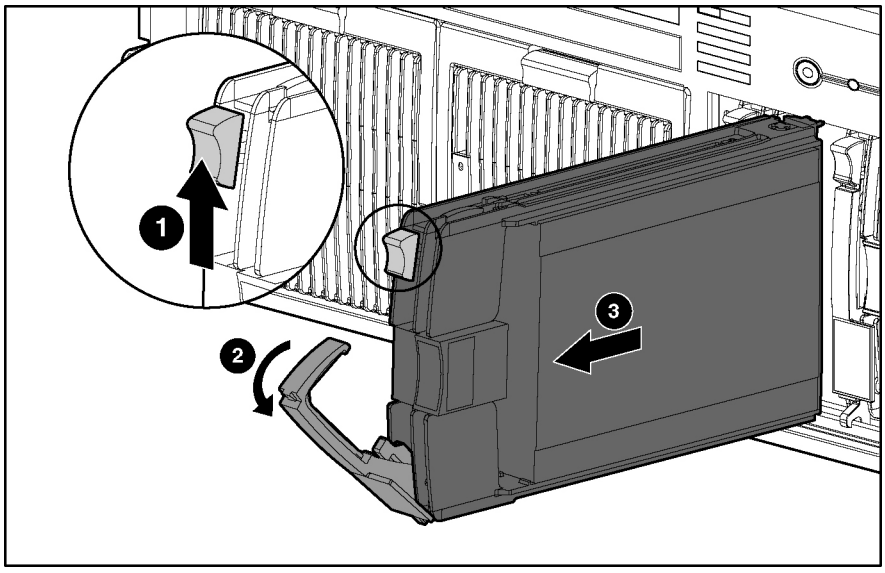

Figure 2-16: Removing a hot-plug SCSI hard drive

IMPORTANT: Always populate hard drive bays starting with the lowest SCSI ID.

Reverse the steps to replace a hot-plug SCSI hard drive.

Power Supply Blank

To remove a power supply blank:

1. Press the lever-release button on the handle of the power supply blanks (1).
2. Pull on the lever to release the blank (2).
3. Remove the power supply blank from the server (3).

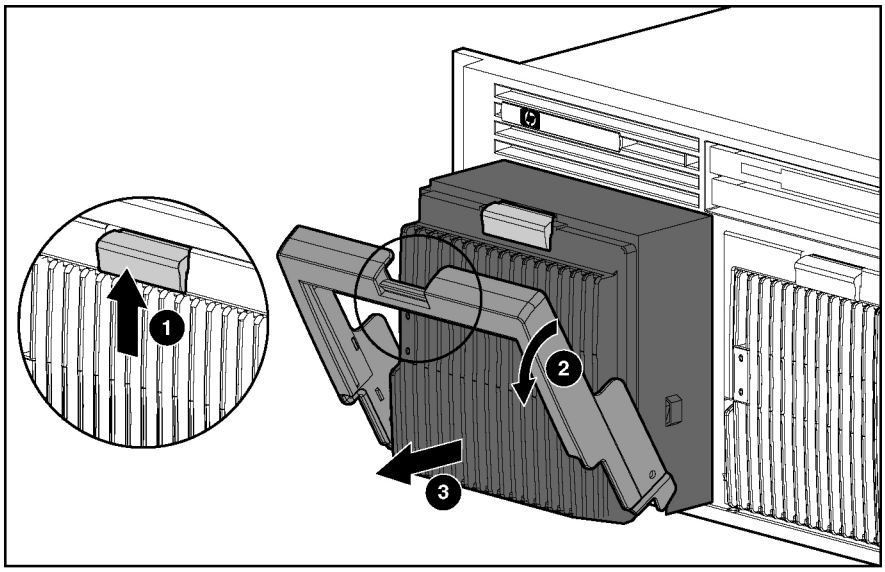

Figure 2-17: Removing a power supply blank

NOTE: Keep the power supply blank for future use.

Reverse the steps to replace the power supply blank.

Hot-Plug Power Supplies

For information on power supply diagnosis, refer to "Hot-Plug Power Supply LEDs" in Chapter 4, "Server Component Identification."

CAUTION: Do not remove a hot-plug power supply unless there are two power supplies installed. If second power supply is not installed, the system must be powered down to remove the power supply.

CAUTION: Hot-plug power supplies for the Server are keyed to be sure that only 800-W hot-plug power supplies can be installed in the server. The handles on 800-W power supplies are black to distinguish them from other power supplies.

To remove a hot-plug power supply:

1. Remove the power supply shipping screw from the bottom of the server, if installed.
2. Press the lever-release button on the handle of the power supply (1).
3. Pull on the lever to release the power supply (2).
4. Remove the power supply from the server (3).

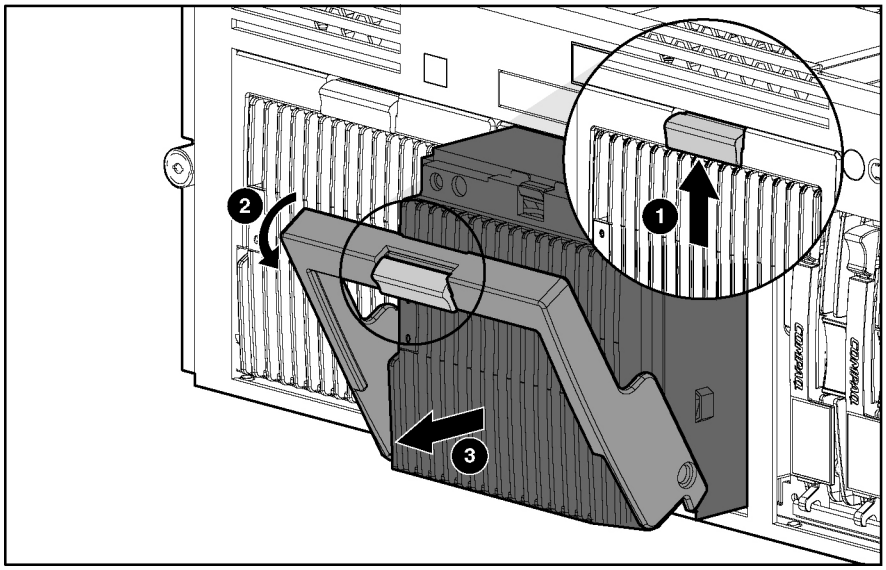

Figure 2-18: Removing a hot-plug power supply

Reverse the steps to replace the hot-plug power supply.

Hot-Plug Fans

The server supports redundant hot-plug fans in a 7+1 configuration.

To replace a hot-plug fan:

1. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
2. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
3. Identify the malfunctioned fan by checking for an amber LED on the QuickFind Diagnostic Display or on the failed fan.
4. Remove the malfunctioned fan.

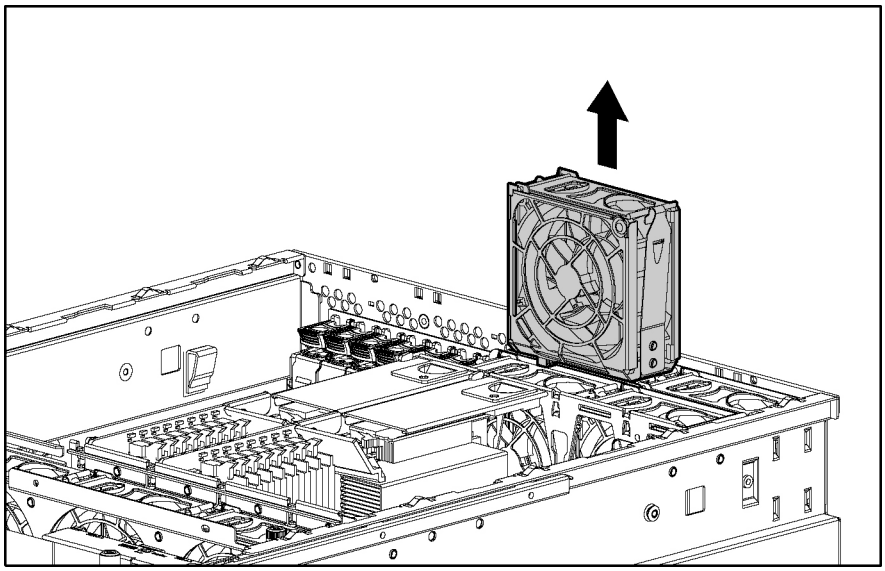

Figure 2-19: Removing a hot-plug fan

5. Install the fan.
6. Be sure that the LED on the fan is green.
7. Reinstall the access panel.
8. Restore the server to its operating position in the rack.

CAUTION: Do not operate the server for extended periods without the access panel installed. Operating the server without the access panel results in improper airflow that can lead to thermal damage.

For information on hot-plug fan diagnosis, refer to "Hot-Plug Fan" in Chapter 4, "Server Component Identification."

Universal Media Drives

To remove a universal media drive:

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Use the Torx T-15 tool to press the appropriate ejection button, and pull the universal media drive out of the universal media bay. Refer to "Locating and Removing the Torx T-15 Tool" earlier in this chapter.

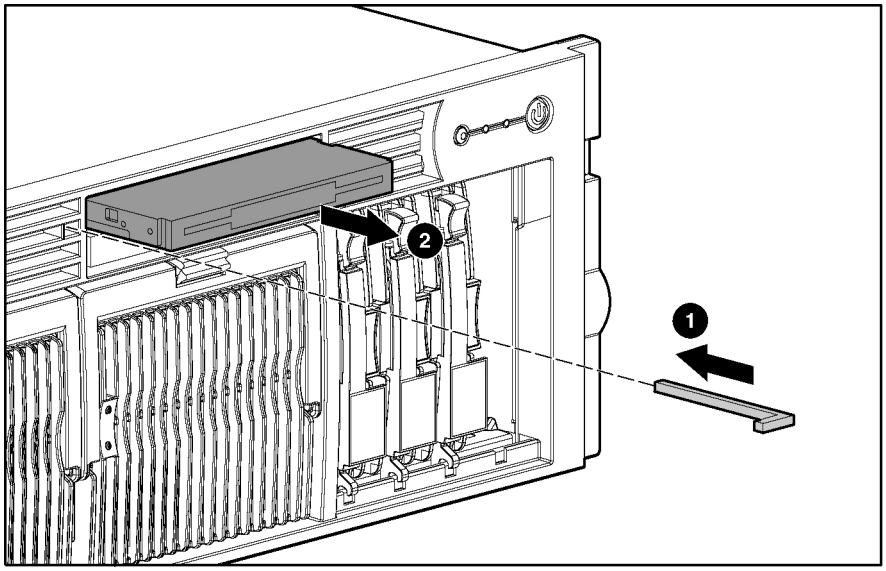

Figure 2-20: Removing a drive from bay 1

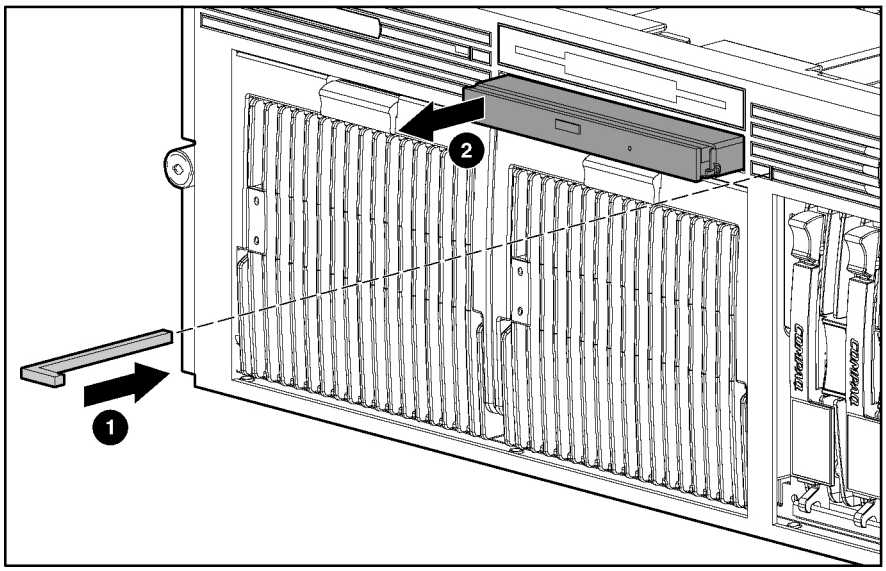

Figure 2-21: Removing a drive from bay 2

To replace a universal media drive, slide the drive into the slot until it engages the connector.

IMPORTANT: For the diskette drive to be bootable, it must be installed in the top universal media drive bay. For the CD-ROM or DVD-ROM drive to be bootable, it must be installed in the bottom universal media drive bay.

Front Bezel

To remove the front bezel:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Using the T-15 Torx tool, remove the six screws on the exterior of the chassis (1) and the two screws on the interior of the chassis next to the universal media drive bays (2).

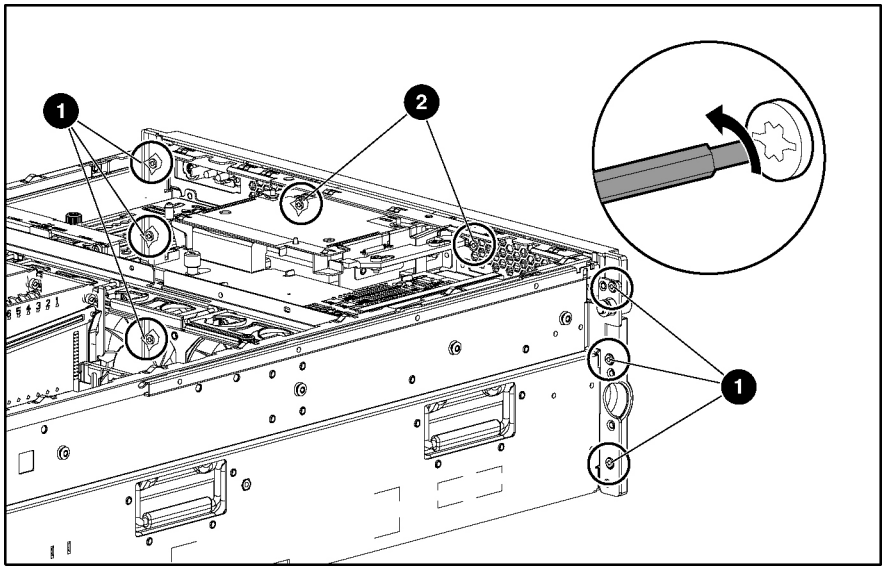

Figure 2-22: Removing the exterior and interior chassis screws

5. Using a flathead screwdriver, disengage the locking tabs on the bezel from underneath the chassis (1).
6. Remove the front bezel (2).

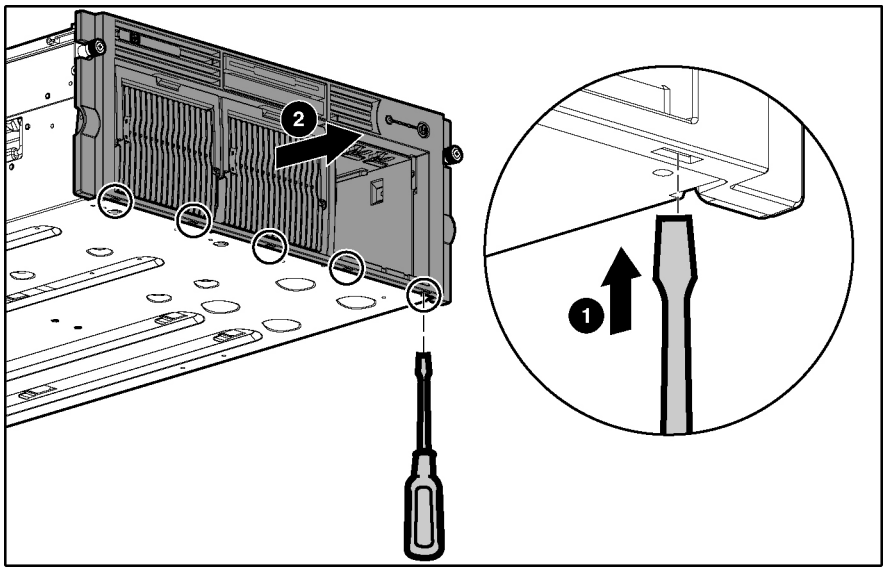

Figure 2-23: Disengaging the locking tabs and removing the front bezel

Reverse the steps to replace the front bezel.

Power Button/LED assembly

To remove the power button/LED assembly:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Unplug the cable from the diagnostic display board (1).
5. Push on the locking tab until the opposite side comes out (2).

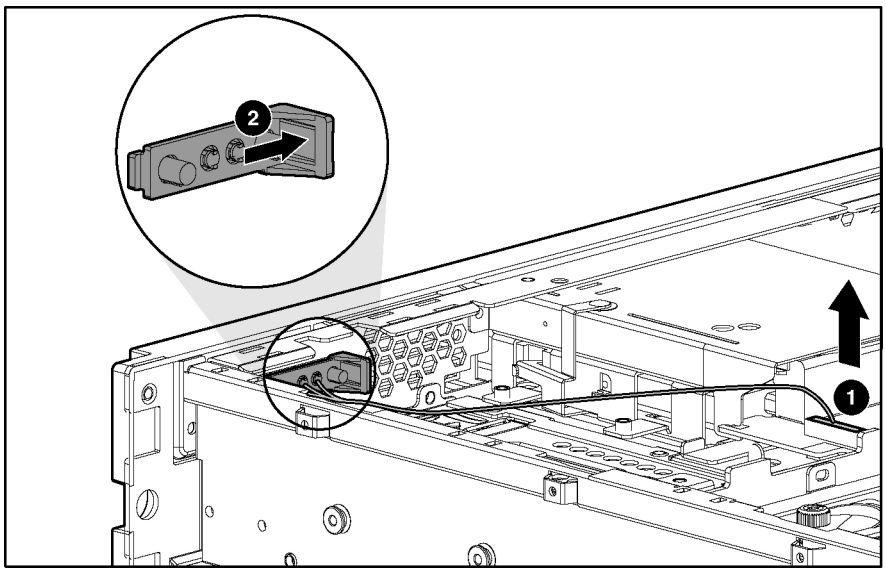

Figure 2-24: Removing the power button/LED assembly

Reverse the steps to replace the power button/LED assembly.

PCI-X Expansion Boards

The server supports the installation of both PCI and PCI-X expansion boards.

- PCI 33-MHz and 66-MHz
- PCI-X 66-MHz, 100-MHz, and 133-MHz

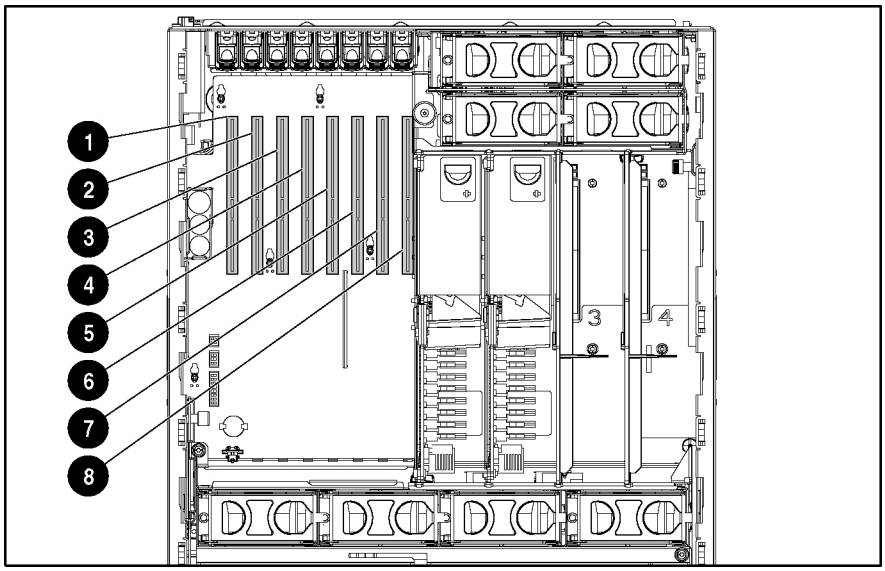

Figure 2-25: PCI-X expansion slots and buses

Table 2-3: PCI-X Expansion Slots and Buses

Item	Slot	Bus	Description
1	Slot 1	Fifth bus	133 MHz
2	Slot 2	Sixth bus	133 MHz
3	Slot 3	Seventh bus	100 MHz
4	Slot 4	Seventh bus	100 MHz
5	Slot 5	Eighth bus	100 MHz
6	Slot 6	Eighth bus	100 MHz
7	Slot 7	Third bus	100 MHz
8	Slot 8	Third bus	100 MHz
Note: All PCI-X slots are 64-bit, 3.3-V keyed.			

Performance Balancing

Balancing is the paired arrangement of expansion boards for optimal performance based on the bus architecture of the expansion slots. Properly balancing the boards across buses can improve performance. To balance expansion boards:

- Populate slots 1 and 2 with 133-MHz PCI-X boards.
- Populate slots 3-8 with 100-MHz PCI-X boards.
- Populate slots across different buses before populating two slots on the same bus.

For more information about PCI-X bus architecture and numbering, refer to the white paper, *PCI Bus Numbering in a Windows NT Environment*, on the HP website at:

www.hp.com

PCI-X Expansion Boards

To remove a PCI-X expansion board:

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
3. Remove the access panel. Refer to "Removing the Access Panel" earlier in this chapter.
4. Disconnect any cables connected to the expansion boards.
5. Press the PCI-X retaining clip toward the front of the server to lock it in the open position.
6. Press down on the expansion slot latch to release it (1).
7. Open the latch (2).

8. Remove the board from the slot (3).

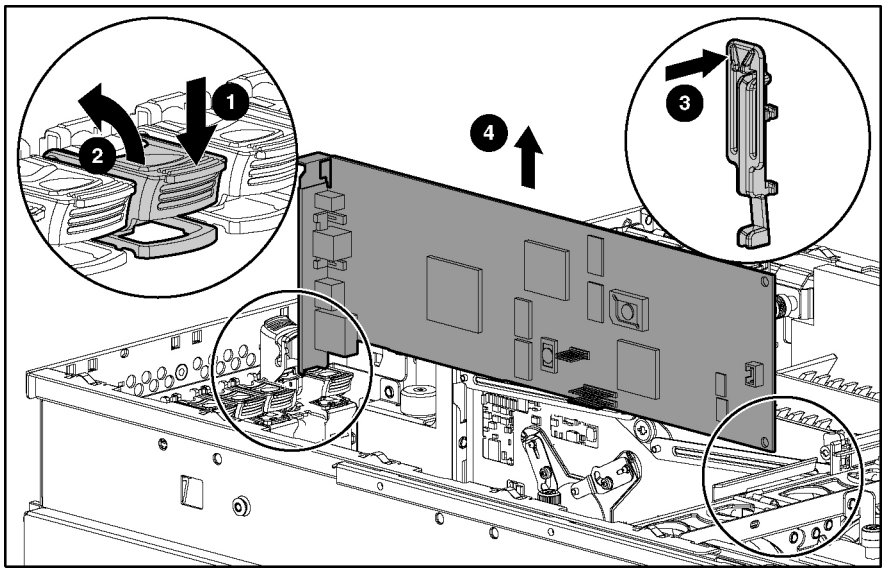

Figure 2-26: Removing an expansion board

Reverse the steps to replace an expansion board.

SCSI Cables

To remove the SCSI cables:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Disconnect the SCSI cables from the SCSI backplane.
5. Disconnect the SCSI cables from the PCI-X expansion boards.

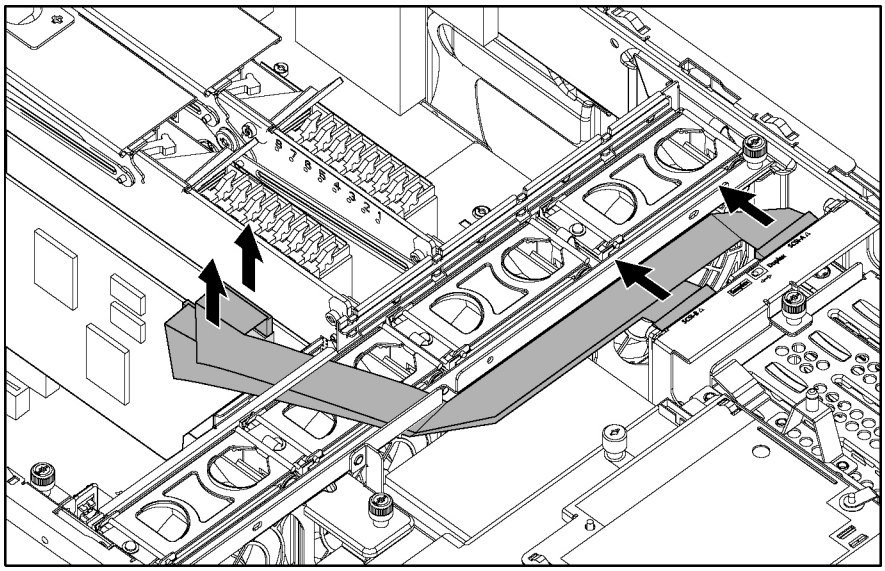

Figure 2-27: Disconnecting the SCSI cables

Reverse the steps to replace or install the SCSI cables.

Front Fan Cage

To remove the front fan cage:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the PCI-X expansion boards. Refer to “PCI-X Expansion Boards” earlier in this chapter.
6. Remove the SCSI cables. Refer to “SCSI Cables” earlier in this chapter.
7. Loosen the three thumbscrews that secure the front fan cage to the chassis (1).

NOTE: It is not necessary to remove the fans prior to removing the fan cage. The fan cage can be removed with the fans installed.

8. Remove the hot-plug fans in the front fan cage. Refer to “Hot-Plug Fans” earlier in this chapter.
9. Lift the front fan cage from the chassis (2).

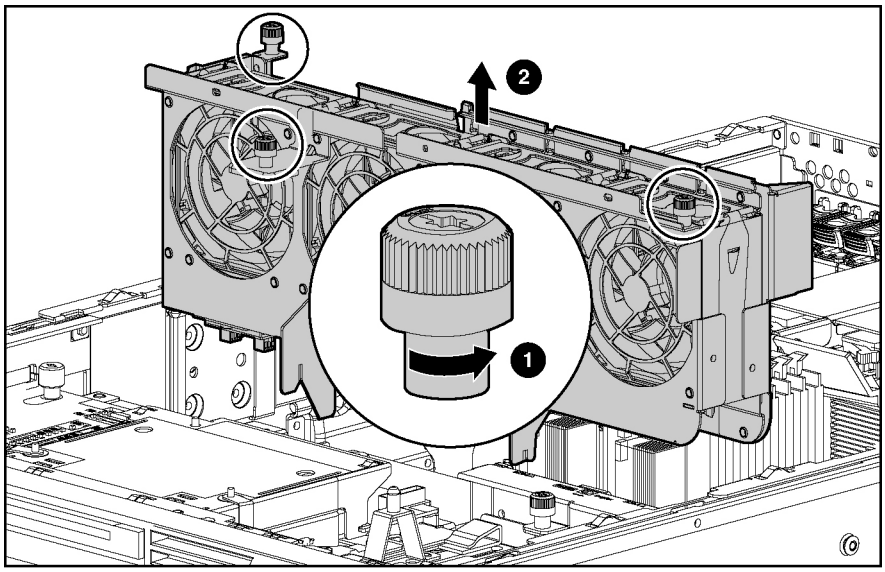

Figure 2-28: Removing the front fan cage

Reverse the steps to replace the front fan cage.

Pass-Through Board

To remove the pass-through board:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the PCI-X expansion boards. Refer to “PCI-X Expansion Boards” earlier in this chapter.
6. Remove the SCSI cables. Refer to “SCSI Cables” earlier in this chapter.
7. Remove the front fan cage. Refer to “Front Fan Cage” earlier in this chapter.
8. Loosen the two thumbscrews that secure the pass-through board to the diagnostic display board and the side chassis wall (1). You may need to use a Torx T-15 screwdriver.
9. Lift the pass-through board straight up and out of the chassis (2).

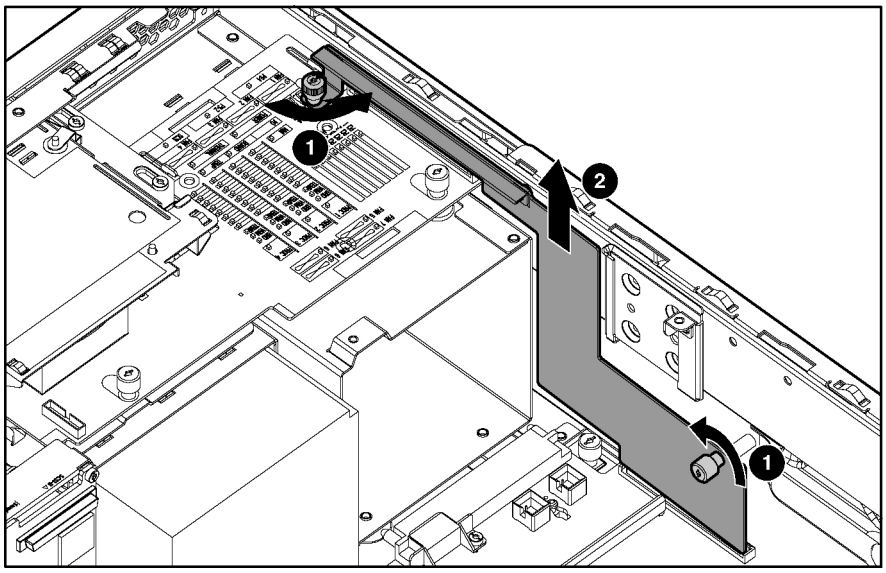

Figure 2-29: Removing the pass-through board

NOTE: Align the board with connectors on both ends and press simultaneously when installing.

Reverse the steps to replace the pass-through board.

Diagnostic Display Board and Lightpipe

To remove the diagnostic display board and lightpipe:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.
5. Remove the PCI-X expansion boards. Refer to “PCI-X Expansion Boards” earlier in this chapter.
6. Remove the SCSI cables. Refer to “SCSI Cables” earlier in this chapter.
7. Remove the front fan cage. Refer to “Front Fan Cage” earlier in this chapter.
8. Remove the pass-through board. Refer to “Pass-Through Board” earlier in this chapter.
9. Eject all devices from the universal media drive bays. Refer to “Universal Media Drives” earlier in this chapter.
10. Unplug the Power Button/LED cable. Refer to “Power Button/LED Assembly” earlier in this chapter.
11. Loosen the two thumbscrews holding the diagnostic display board (1).
12. Slide the board to the rear of the unit until it stops, and then lift it up (2).

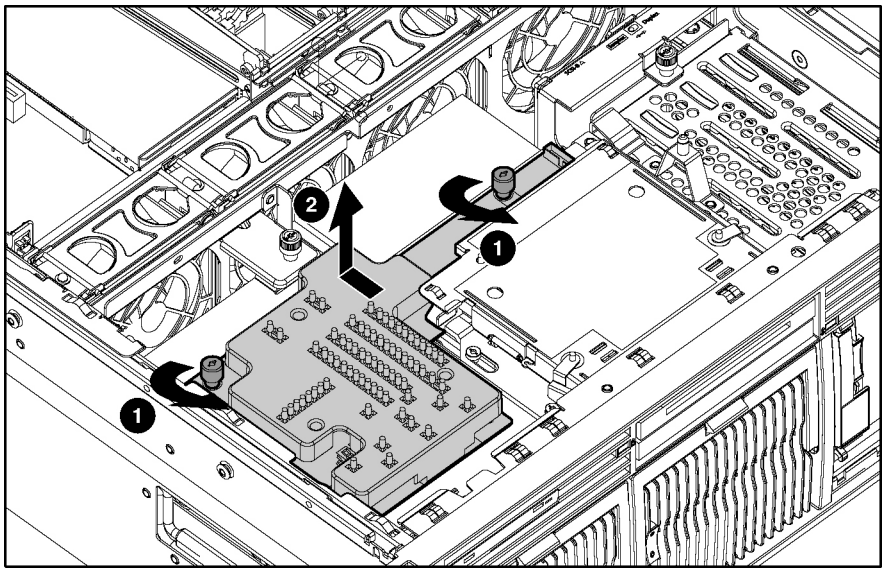

Figure 2-30: Removing the diagnostic display board and lightpipe

13. Lift the board out gently, being careful of the universal media drive bay connector.

Reverse the steps to replace the diagnostic display board and lightpipe.

Rear Fan Cage

To remove the rear fan cage:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter.
3. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
4. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.

NOTE: It is not necessary to remove the fans prior to removing the fan cage. The fan cage can be removed with the fans installed.

5. Loosen the two thumbscrews that secure the rear fan cage to the chassis (1).
6. Remove the rear fan cage from the chassis (2).

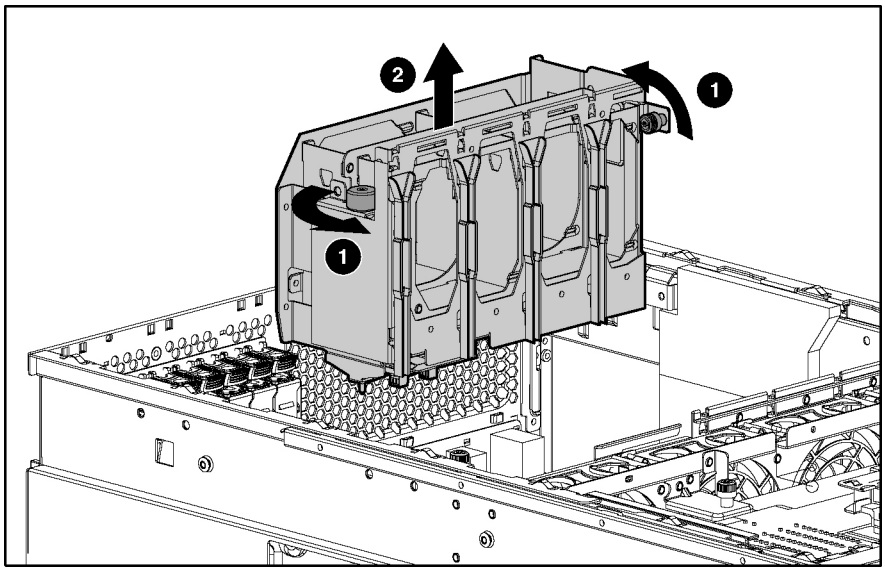

Figure 2-31: Removing the rear fan cage

Reverse the steps to replace the rear fan cage.

Battery-Backed Write Cache Assembly

IMPORTANT: The Battery-Backed Write Cache Enabler (BBWCE) and the 5i Plus BBWC Module **must** be removed together with the cable connected to save the data in the cache. Unplugging the cable deletes all the data in the cache.

To remove the BBWC assembly:

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
3. Remove the access panel. Refer to "Removing the Access Panel" earlier in this chapter.
4. Remove the processor memory boards. Refer to "Processor Memory Boards" earlier in this chapter.
5. Remove the SCSI cables. Refer to "SCSI Cables" earlier in this chapter.
6. Remove the PCI-X expansion boards. Refer to "PCI-X Expansion Boards" earlier in this chapter.
7. Remove the front fan cage. Refer to "Front Fan Cage" earlier in this chapter.

8. Remove the 5i Plus BBWC Module.

CAUTION: Do not disconnect the cable connecting the BBWCE and the 5i Plus BBWC Module. Unplugging the cable deletes all the data in the cache.

9. Remove the BBWCE.

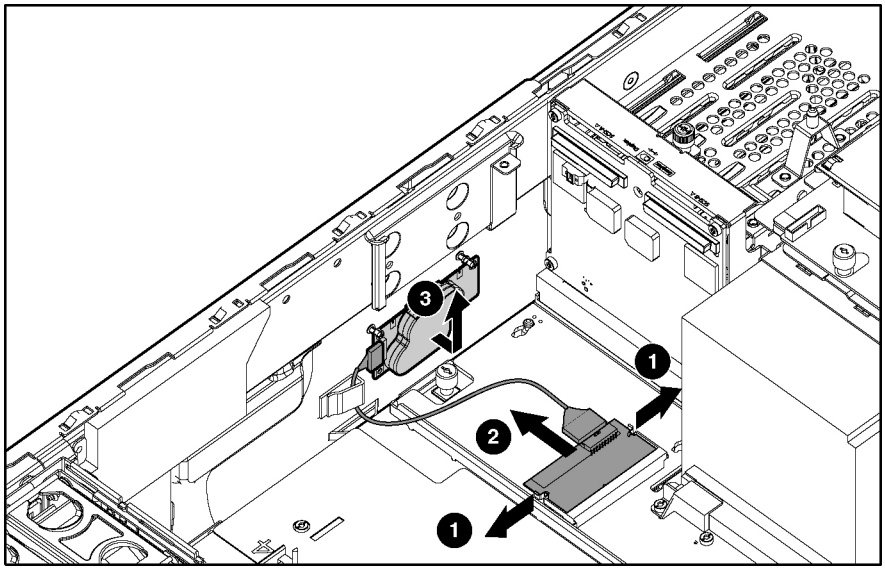

Figure 2-32: Removing the BBWC enabler and 5i Plus BBWC Module

Reverse the steps to replace the BBWC Enabler and 5i Plus BBWC Module.

SCSI Backplane

To remove the SCSI backplane:

1. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
2. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
3. Unseat all the hot-plug SCSI hard drives and pull them away from the SCSI backplane. Refer to "Hot-Plug SCSI Hard Drives" earlier in this chapter.

   NOTE: If you plan to take the hard drives out of the drive cage, label them so that they will be installed in the same slot.

4. Remove the access panel. Refer to "Removing the Access Panel" earlier in this chapter.
5. Disconnect any SCSI cables from the SCSI backplane. Refer to "SCSI Cables" earlier in this chapter.
6. Loosen the thumbscrew (1).
7. Remove the SCSI backplane from the chassis (2).

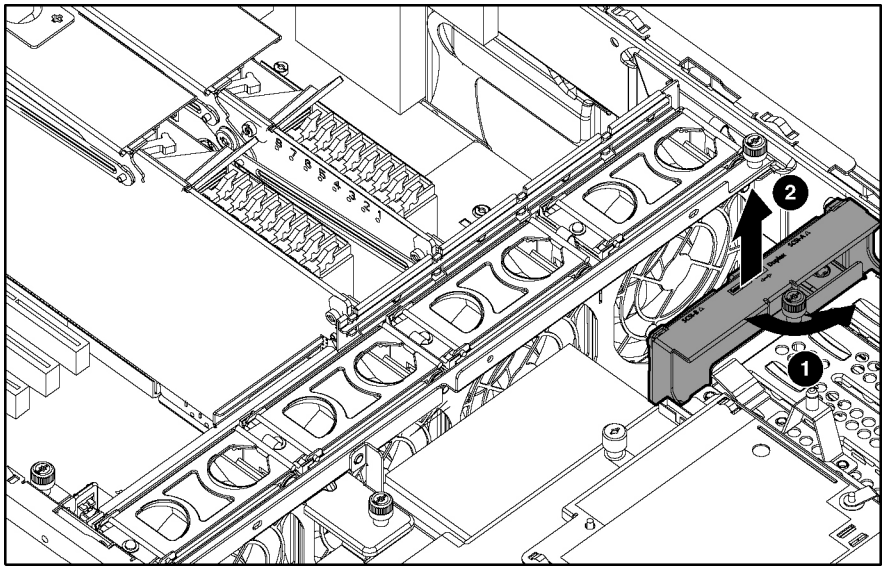

Figure 2-33: Removing the SCSI backplane

Reverse the steps to replace the SCSI backplane.

System Battery

WARNING: This server contains an internal lithium manganese dioxide or vanadium pentoxide battery. A risk of fire and burns exists if the battery is not handled properly. To reduce the risk of personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the HP spare designated for this server.**

CAUTION: Do not dispose of batteries, battery packs, and accumulators with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to either HP or an authorized service provider.

To remove the battery:

1. Power down the server. Refer to "Powering Down the Server" earlier in this chapter.
2. Extend the server from the rack. Refer to "Extending the Server from the Rack" earlier in this chapter.
3. Remove the access panel. Refer to "Removing the Access Panel" earlier in this chapter.
4. Locate the battery on the system board.

NOTE: It may be necessary to remove some PCI-X expansion boards to gain access to the battery.

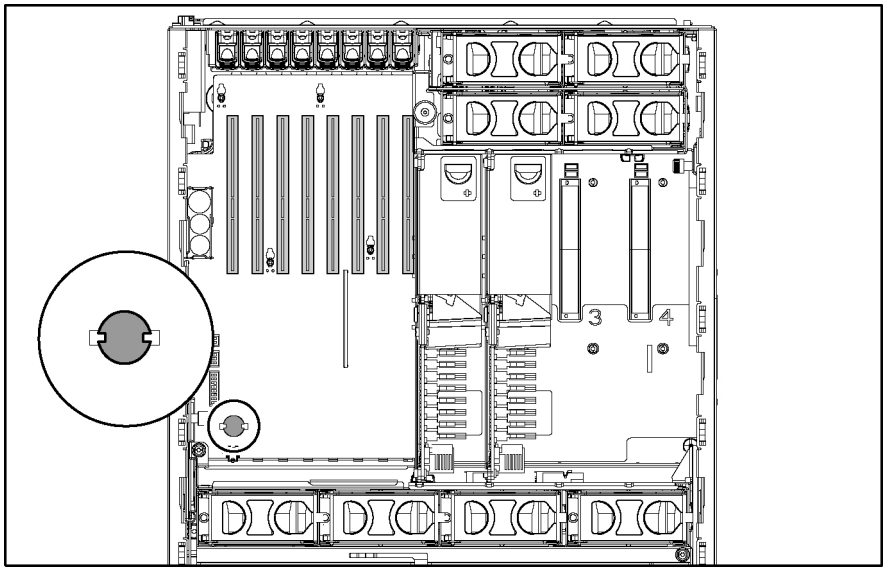

Figure 2-34: Locating the battery on the system board

5. Remove the existing battery.

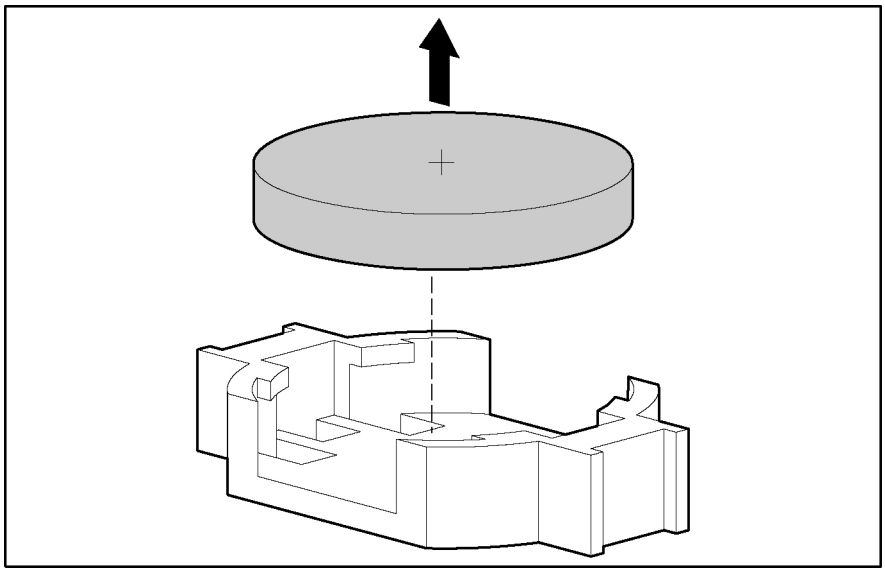

Figure 2-35: Removing the battery from the system board

6. Install the new battery.
7. Install the access panel.
8. Restore the server to its operating position in the rack.
9. Run the RBSU to reconfigure the system if the settings were lost.

System Board

To remove the system board:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Remove all power supplies. Refer to “Hot-Plug Power Supply” earlier in this chapter.
3. Remove all the hot-plug SCSI hard drives. Refer to “Hot-Plug SCSI Hard Drives” earlier in this chapter.

   NOTE: Label the individual hard drives before pulling them out.

4. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter. Although not required, HP recommends removing the server from the rack for best performance. See “Removing the Server from the Rack” earlier in this chapter.
5. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
6. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.
7. Remove the SCSI cables. Refer to “SCSI Cables” earlier in this chapter.
8. Remove the PCI-X expansion boards. Refer to “PCI-X Expansion Boards” earlier in this chapter.
9. Remove the front fan cage. Refer to “Front Fan Cage” earlier in this chapter.
10. Remove the rear fan cage. Refer to “Rear Fan Cage” earlier in this chapter.
11. Remove the pass-through board. Refer to “Pass-Through Board” earlier in this chapter.
12. Remove the SCSI backplane. Refer to “SCSI Backplane” earlier in this chapter.
13. Remove the BBWC assembly. Refer to “Battery-Backed Write Cache Assembly” earlier in this chapter.

14. Remove the lower foam air baffle.
15. Unscrew the system board thumbscrews. It may be necessary to use the Torx tool located on the back of the server.
16. Slide the system board toward the front of the unit.

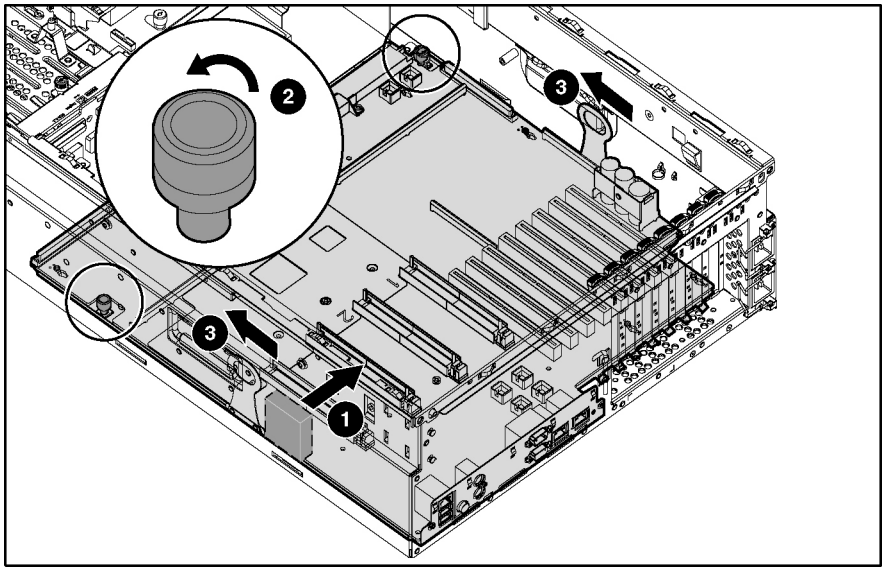

Figure 2-36: Unscrewing the thumbscrews and sliding the system board

IMPORTANT: When handling the system board, place your hands only on the two handles.

17. Grasping the two handles, lift the side with the processor memory board slots first, tilting the board to a 45° angle (1).
18. Lift the entire system board out of the chassis (2).
19. Check the switch settings on the old board against the settings in chapter 4 to be sure that they are in the correct positions.

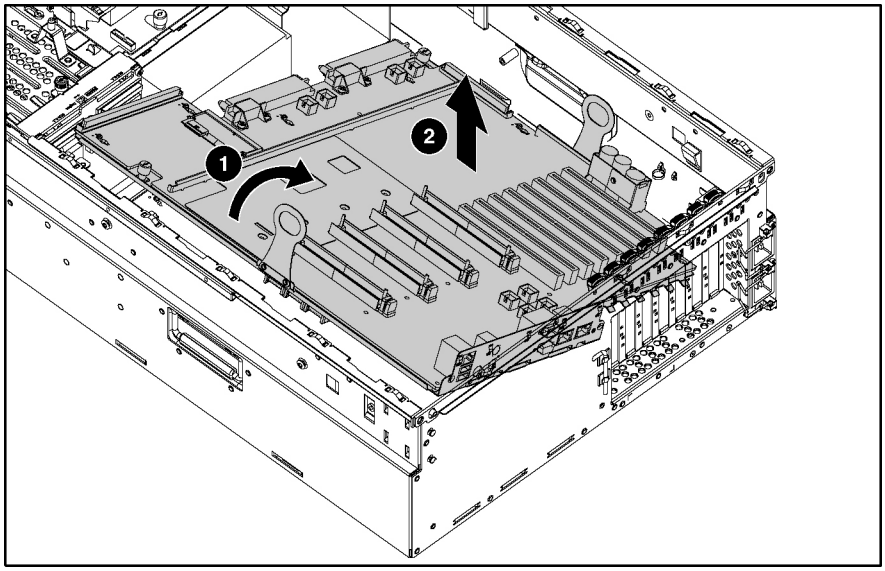

Figure 2-37: Removing the system board from the chassis

Reverse the steps to replace the system board.

IMPORTANT: The server serial number must be re-entered through RBSU after replacing the system board. Refer to the "Re-entering the Server Serial Number" section.

AC Filter Cable Assembly

The AC filter cable assembly consists of two cables leading from separate power supply input connectors near the front of the chassis and ending in an AC filter and inlets at the rear of the chassis.

To remove the AC filter cable:

1. Power down the server. Refer to “Powering Down the Server” earlier in this chapter.
2. Remove all power supplies. Refer to “Hot-Plug Power Supply” earlier in this chapter.
3. Remove all the hot-plug SCSI hard drives. Refer to “Hot-Plug SCSI Hard Drives” earlier in this chapter.

   NOTE: Label the individual hard drives before pulling them out.

4. Extend the server from the rack. Refer to “Extending the Server from the Rack” earlier in this chapter. Although not required, HP recommends removing the server from the rack for best performance. See “Removing the Server from the Rack” earlier in this chapter.
5. Remove the access panel. Refer to “Removing the Access Panel” earlier in this chapter.
6. Remove the processor memory boards. Refer to “Processor Memory Boards” earlier in this chapter.
7. Remove the SCSI cables. Refer to “SCSI Cables” earlier in this chapter.
8. Remove the PCI-X expansion boards. Refer to “PCI-X Expansion Boards” earlier in this chapter.
9. Remove the front fan cage. Refer to “Front Fan Cage” earlier in this chapter.
10. Remove the rear fan cage. Refer to “Rear Fan Cage” earlier in this chapter.
11. Remove the pass-through board. Refer to “Pass-Through Board” earlier in this chapter.
12. Remove the SCSI backplane. Refer to “SCSI Backplane” earlier in this chapter.
13. Remove the BBWC assembly. Refer to “Battery-Backed Write Cache Assembly” earlier in this chapter.
14. Remove the system board. Refer to “System Board” located earlier in this chapter.

15. Cut the four tie-wraps securing the AC filter cable to the chassis.

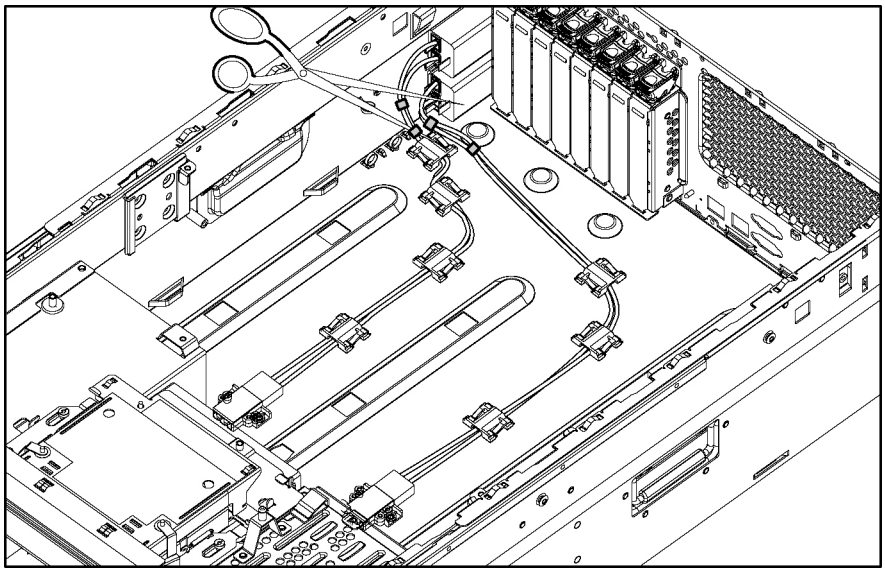

Figure 2-38: Cutting the cable tie-wraps

16. Remove the seven cable clips:
    a. Lift to disengage the cable clip (1).
    b. Slide the clip forward, and lift it off the chassis (2).

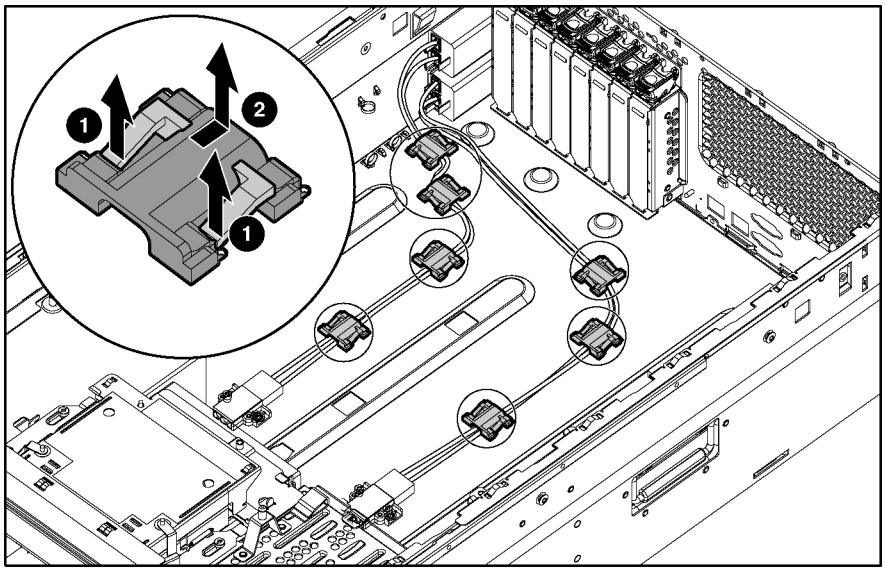

Figure 2-39: Removing the cable clips

17. Use the Torx T-15 tool or screwdriver to remove the eight screws that secure the power supply connectors to the chassis bottom (1).
18. Remove the cords from the connectors (2).
19. Remove the connectors from the server (3).

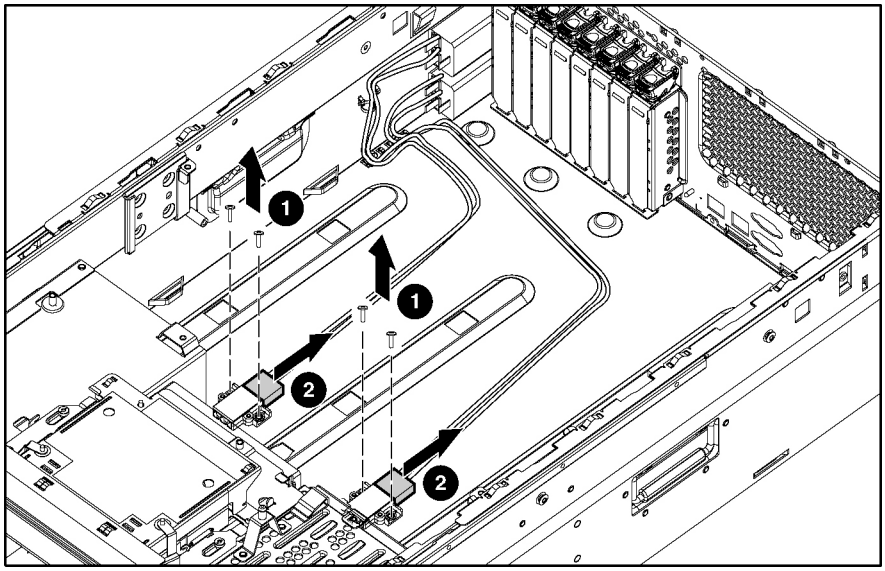

Figure 2-40: Removing the power supply connectors

20. Use the Torx T-15 tool or a screwdriver to remove the four screws that secure the AC filter cable assembly to the rear chassis wall (1).
21. Slide the assembly into the chassis, and then lift the assembly out of the chassis (2).

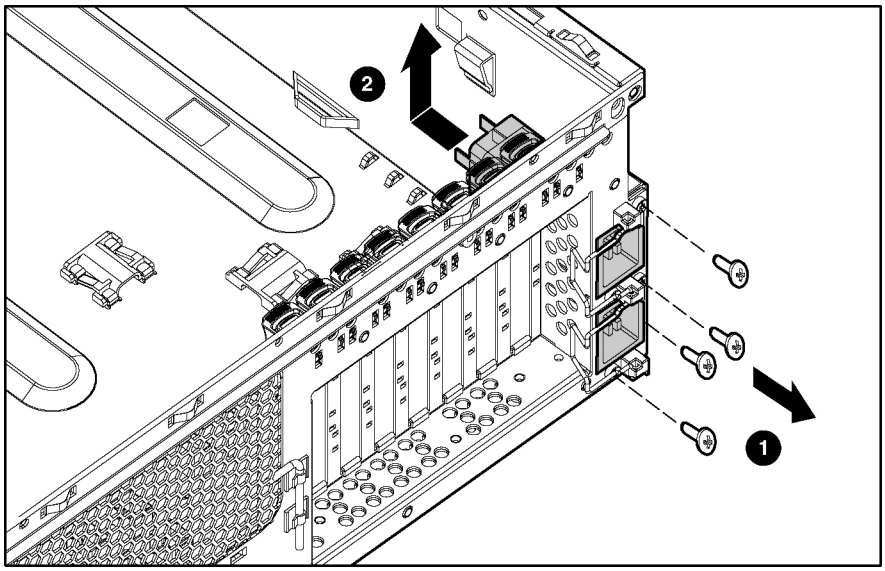

Figure 2-41: Removing the AC filters

Reverse the steps to replace the AC filter cable assembly.

Re-entering the Server Serial Number

After replacing the system board or clearing the NVRAM, the server serial number must be re-entered.

1. To access RBSU, press the **F9** key when prompted during POST.
2. Select the **System Options** menu.
3. Select **Serial Number**. The following warning is displayed:

   ```
   WARNING! WARNING! WARNING! The serial number is loaded into the
   system during the manufacturing process and should NOT be
   modified. This option should ONLY be used by qualified service
   personnel. This value should always match the serial number
   sticker located on the chassis.
   ```

   Press the **Enter** key to clear the warning.
4. Enter the serial number and press the **Enter** key.
5. Press the **Escape** key to close the menu.
6. Press the **Escape** key to exit RBSU.
7. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

3

Diagnostic Tools

Table 3-1: Diagnostic Tools

Tool	Description	How to run the tool
Array Diagnostics Utility (ADU)	ADU is designed to run on all ProLiant systems that support HP array controllers. ADU collects information about the array controllers in the system and generates a list of detected problems.	For a list of HP servers that support ADU, follow the support link on product website at www.hp.com. For a complete list of ADU error messages, refer to the *HP Servers Troubleshooting Guide*.
Automatic Server Recovery-2 (ASR-2)	ASR-2 automatically restarts the server after a catastrophic operating system failure. With ASR-2, you have two recovery options: • Available Recovery provides software error recovery and environmental recovery. • Unattended Recovery logs the error information to the IML, resets the server, and tries to restart the operating system.	Run RBSU and set ASR-2 to enable this tool.
Diagnostics	Diagnostics tests and verifies operation of HP hardware. If Diagnostics finds a hardware failure, it isolates the replaceable part, if possible.	Access Diagnostics when POST detects a system configuration error. For a complete list of POST error messages, refer to the *HP Servers Troubleshooting Guide*. Diagnostics can be run from the SmartStart CD or downloaded by following the support link on the product website at www.hp.com.
Insight Manager 7	Insight Manager 7 is a client/server application used to remotely manage HP hardware in a network environment. Insight Manager reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information on viewing and printing the event list, refer to the Management CD or the *Insight Manager User Guide.*

Table 3-1: Diagnostic Tools

Tool	Description	How to run the tool
Integrated Lights-Out (iLO)	iLO is a remote management port that can be accessed through a dedicated Lights-Out port on the rear panel of the server. Accessed through a standard browser from anywhere, the iLO capabilities will not require any unique software applications to use.	For more information on iLO, refer to the *Integrated Lights-Out User Guide* on the Documentation CD.
Survey Utility	Survey Utility gathers critical hardware and software information on servers running Microsoft Windows, or Linux operating systems. If a significant change occurs between data-gathering intervals, the survey utility marks the previous information and overwrites the survey text files to reflect the latest changes in the configuration.	Install the Survey Utility from the SmartStart CD, the Integration Maintenance Utility, or the Management CD.
Integrated Management Log (IML)	The IML is a log of system events such as system failures or nonfatal error conditions. View events in the IML from within: • Insight Manager 7 • Survey Utility • Operating system-specific IML utilities	The IML requires HP operating system management drivers. Refer to the SmartStart CD for instructions on installing the appropriate drivers.
ROM-Based Setup Utility (RBSU)	RBSU configures the hardware installed in or connected to the server. Specifically, it can: • Store configuration information in nonvolatile memory • Manage memory installation, processor upgrades, network interface cards and mass storage devices • Assist in installing an operating system • Configure ports and IRQs, if required	Run RBSU by pressing the **F9** key during POST.
ROMPaq Utility	The ROMPaq Utility checks the system and provides a choice of available ROM revisions and controller firmware.	Run this utility from the SmartStart CD included with the server.

4

Server Component Identification

This chapter explains the location and function of system connectors, internal and external LEDs, and system switches.

Connectors

Use this section to identify system connectors for service procedures.

Rear Panel

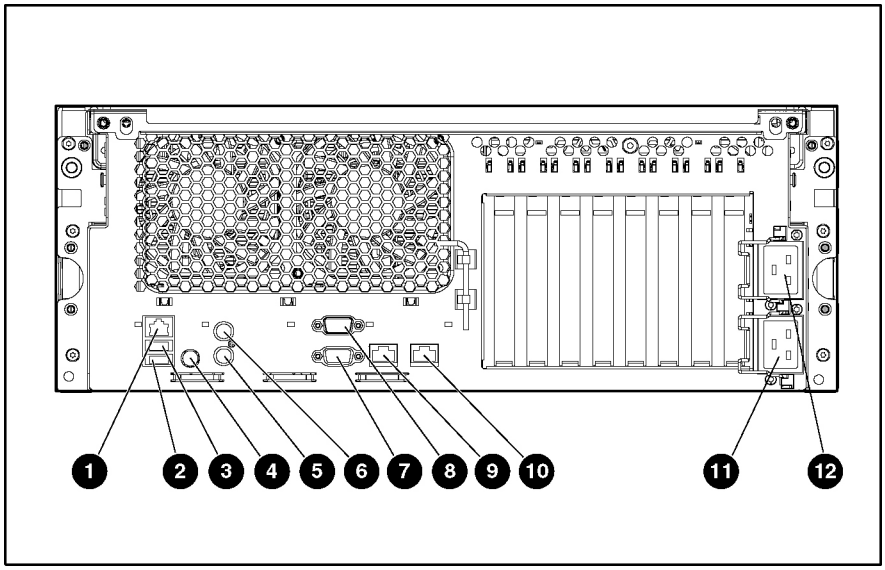

Figure 4-1: Rear panel components

Table 4-1: Rear Panel Components

Item	Description
1	Integrated Lights-Out Manager connector
2	USB connector 1
3	USB connector 2
4	Rear Unit Identification button and LED
5	Keyboard connector
6	Mouse connector
7	Video connector
8	Serial connector
9	NIC 2
10	NIC 1
11	AC inlet 1(primary)
12	AC inlet 2 (optional)

SCSI Backplane Board

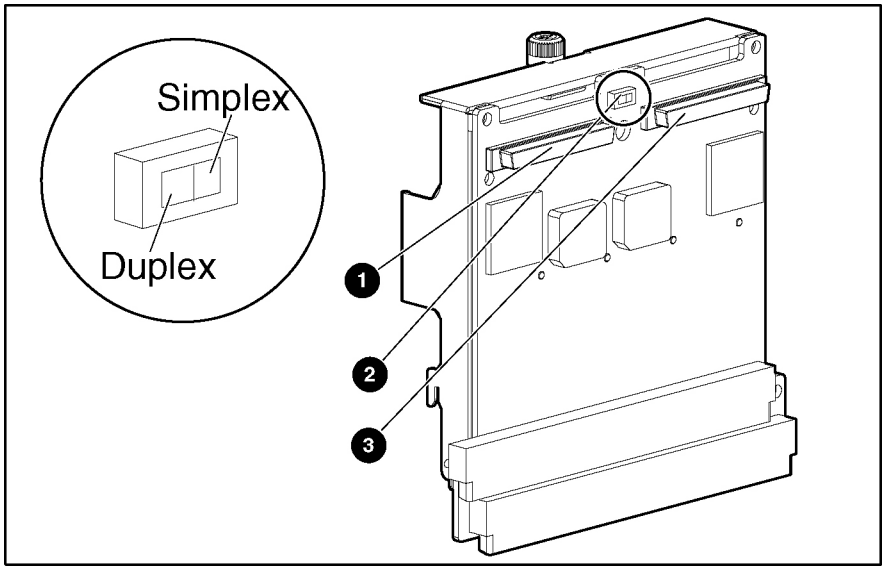

Figure 4-2: SCSI backplane board connectors

Table 4-2: SCSI Backplane Board Connectors

Item	Description
1	SCSI channel A
2	SCSI simplex/duplex switch (default = duplex)
3	SCSI channel B

Processor Memory Board

DIMM Slots

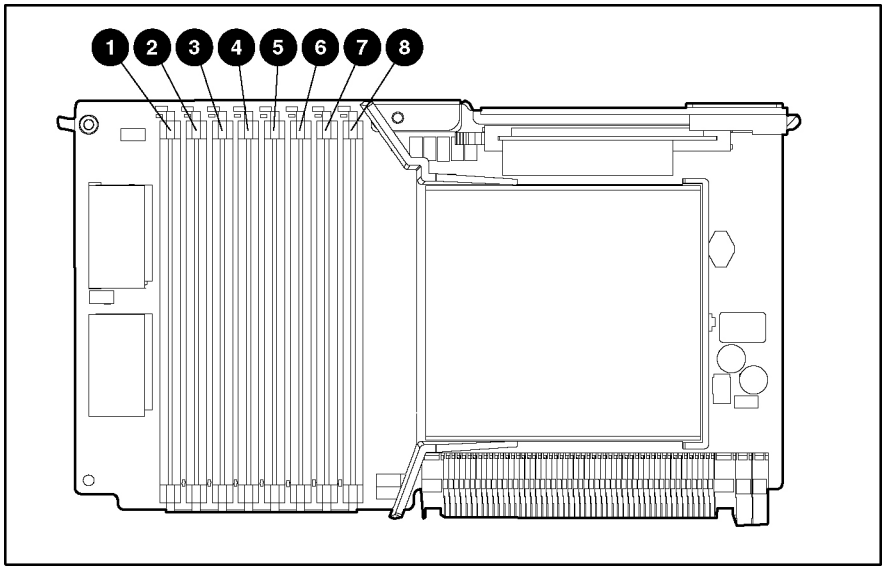

Figure 4-3: DIMM slots

Table 4-3: Processor Memory Board Memory Banks

Slot	Bank
1 - 2	Bank 1
3 - 4	Bank 2
5 - 6	Bank 3
7 - 8	Bank 4

Processor and Processor Power Module

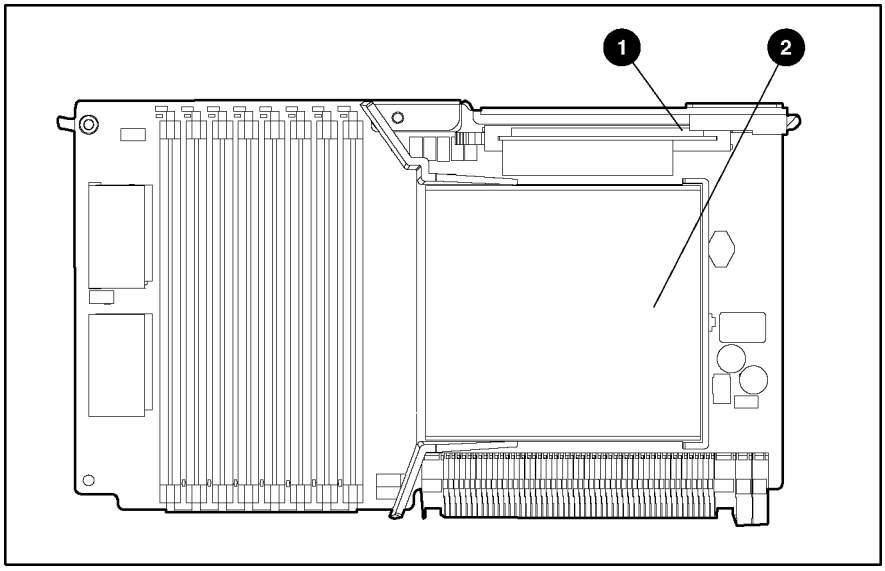

Figure 4-4: Processor and processor power module

Table 4-4: Processor and Processor Power Module

Item	Description
1	Processor Power Module
2	Processor and heatsink

LEDs

The server contains several sets of LEDs that indicate the status and settings of hardware components.

Front Panel

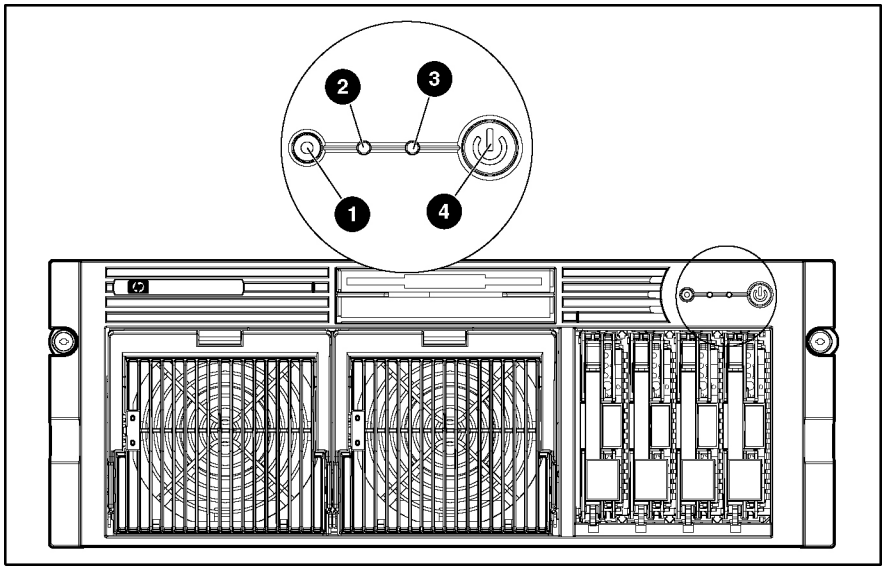

Figure 4-5: Front panel LEDs

Table 4-5: Front Panel LEDs

Item	Description	Status
1	Unit ID	Blue = Activated Blue flashing = System being managed remotely Off = Deactivated
2	Internal health	Green = Normal Red = System critical Amber = System degraded Off = System off
3	External health	Green = Normal Red = Critical power supply failure Amber = Redundant power supply failure Off = System off
4	Power	Green = On Amber = Off (auxiliary power only) Off = Power cord not attached to the server or power supply failure

QuickFind Diagnostic Display

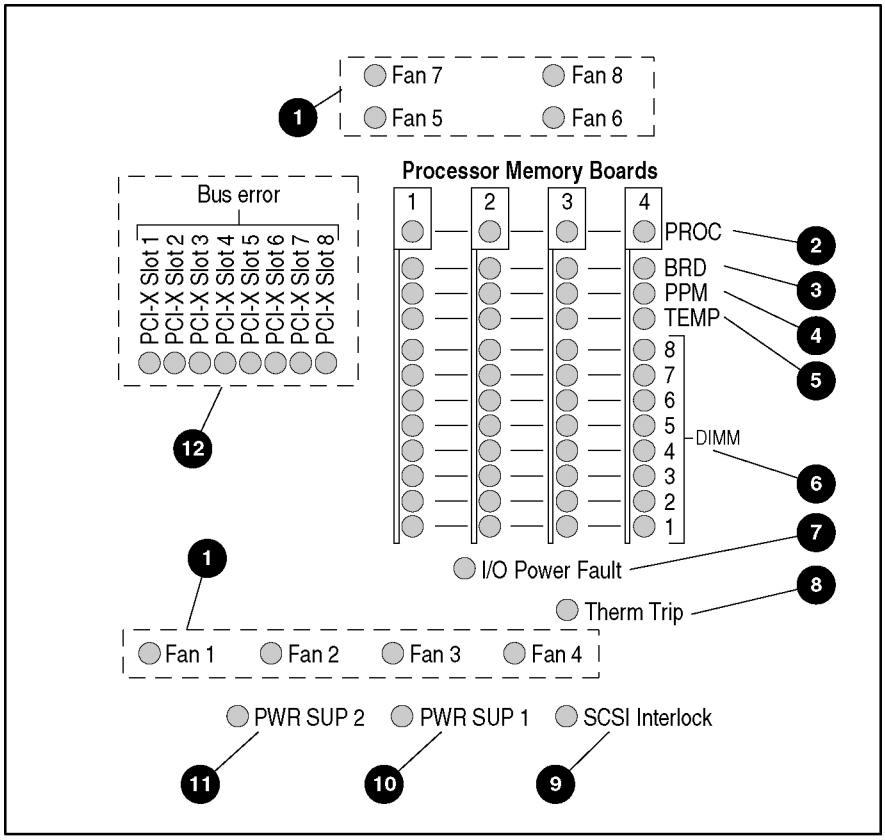

Figure 4-6: QuickFind Diagnostic Display LEDs

Table 4-6: QuickFind Diagnostic Display LEDs

Item	Description	Status	Action
1	Fan	Off = normal	Be sure fan is installed and seated properly.
		On = attention required	If fan is installed and seated properly, replace the fan.
2	Processor	Off = normal	Processor pre-failure notification. Inspect the IML logs and/or POST messages. Processor may need to be replaced.
		On = attention required	
3	Processor memory board	Off = normal	Processor memory board power failure. If problem persists, replace processor/memory board.
		On = attention required	
4	Processor power module	Off = normal	PPM power failure. If problem persists, replace PPM.
		On = attention required	If the PPM and the BRD LEDs are both on, there is a configuration error.

continued

Table 4-6: QuickFind Diagnostic Display LEDs *continued*

Item	Description	Status	Action
5	Temperature	Off = normal On = attention required	One or more components have experienced an elevated temperature or a thermal shutdown. A thermal shutdown is indicated by the Therm Trip LED. • Be sure the processor heatsink is properly attached. • Be sure there are no 1.7-inch DIMMs installed that prevent airflow across the processor heatsink). • Be sure the correct DIMMs (1.2 inches tall) are installed. • Be sure that all fans are installed and working properly. • Be sure that the server environment meets posted requirements. For information about server environment requirements refer to the *HP ProLiant DL585 Server User Guide* on the documentation CD or at www.hp.com/support.
6	DIMM	Off = normal On = attention required	DIMM failure or configuration error. Refer to the IML or POST messages.
7	I/O power fault	Off = normal On = attention required	A power fault on the system I/O board occurred. If problem persists, replace the system I/O board.
8	Therm trip	Off = normal On = attention required	The server experienced a thermal shutdown. If one of the CPU thermal LEDs is amber, that CPU experienced an overtemperature condition. • Be sure that the processor heatsink is properly attached. For more information, refer to Chapter 5, "Troubleshooting." • Be sure there are no 1.7-inch DIMMs installed that prevent airflow across the processor heatsink). • Be sure the correct DIMMs (1.2 inches tall) are installed. • Be sure all fans are installed and working properly.
9	SCSI interlock	Off = normal On = attention required	Be sure the SCSI backplane is installed properly.
10	Power supply 1	Off = normal On = attention required	Look at the LEDs on the front of the power supply and take the appropriate action.
11	Power supply 2	Off = normal On = attention required	Look at the LEDs on the front of the power supply and take the appropriate action.

12	Bus error	Off = normal	A bus error occurred.
		On = attention required	The error may have been caused by one of the adapter cards on this bus (see amber LEDs for which slots may have caused the error). If problem persists, remove/replace one or both of the cards.

Hot-Plug SCSI Hard Drive

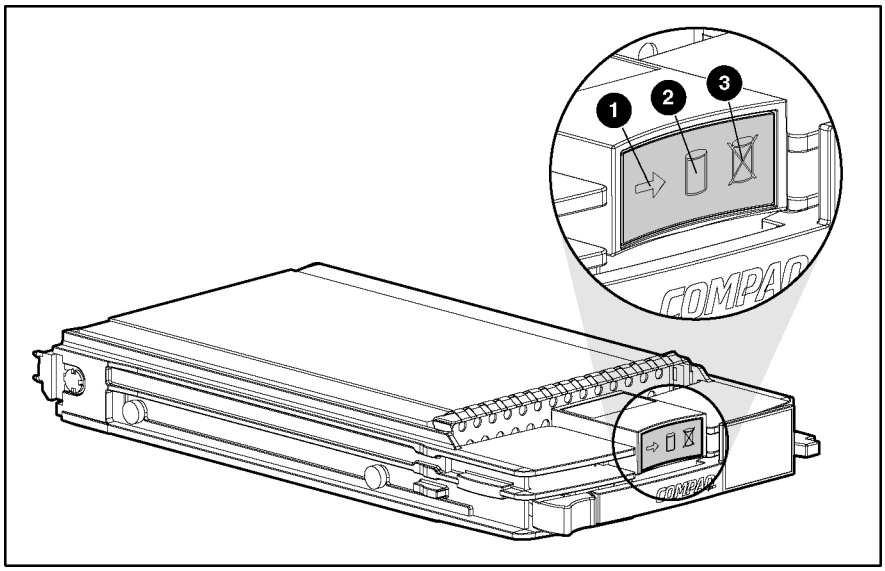

Figure 4-7: Hot-plug SCSI hard drive LEDs

Table 4-7: Hot-Plug SCSI Hard Drive LEDs

Item	Description	Status
1	Drive activity	On = Drive activity
		Flashing = High activity on the drive or drive is being configured as part of an array
		Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working
		Flashing = Online activity
		Off = No online activity
3	Fault status	On = Drive failure
		Flashing = Fault-process activity
		Off = No fault-process activity

Table 4-8: Hot-Plug SCSI Hard Drive LED Combinations

Activity LED	Online LED	Fault LED	Status
On	Off	Off	**Do not remove the drive. Removing a drive during this process will cause data loss.** The drive is being accessed and is not configured as part of an array.
On	Flashing	Off	**Do not remove the drive. Removing a drive during this process will cause data loss.** The drive is rebuilding or undergoing capacity expansion.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive during this process will cause data loss.** The drive is part of an array being selected by the Array Configuration Utility. -Or- The Options ROMPaq is upgrading the drive.
Off	Off	Off	OK to replace the drive online if a predictive failure alert is received, and the drive is attached to an array controller. The drive is not configured as part of an array. -Or- If this drive is part of an array, then a powered-on controller is not accessing the drive. -Or- The drive is configured as an online spare.
Off	Off	On	OK to replace the drive online. The drive has failed and has been placed off line.
Off	On	Off	OK to replace the drive online if a predictive failure alert is received, provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
On or flashing	On	Off	**Do not remove the drive. Removing a drive during this process will cause data loss.** The drive is online and being accessed.

Hot-Plug Fan

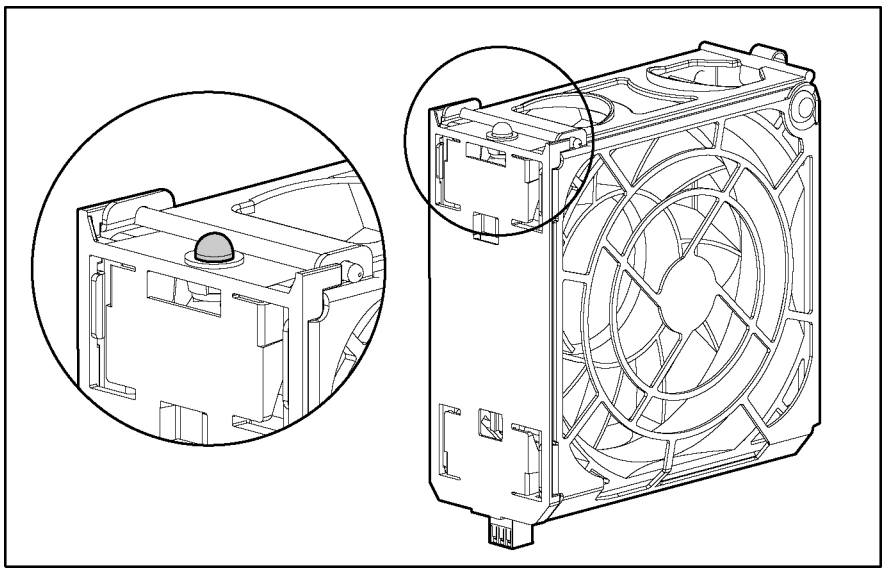

Figure 4-8: Hot-plug fan LED

The hot-plug fan LED indicates the following conditions:

Table 4-9: Hot-Plug Fan LED

LED Status	Description
Off	Power is not applied to the fan
Green	Power is applied to the fan and the fan is functional
Amber	Fan failure

Hot-Plug Power Supplies

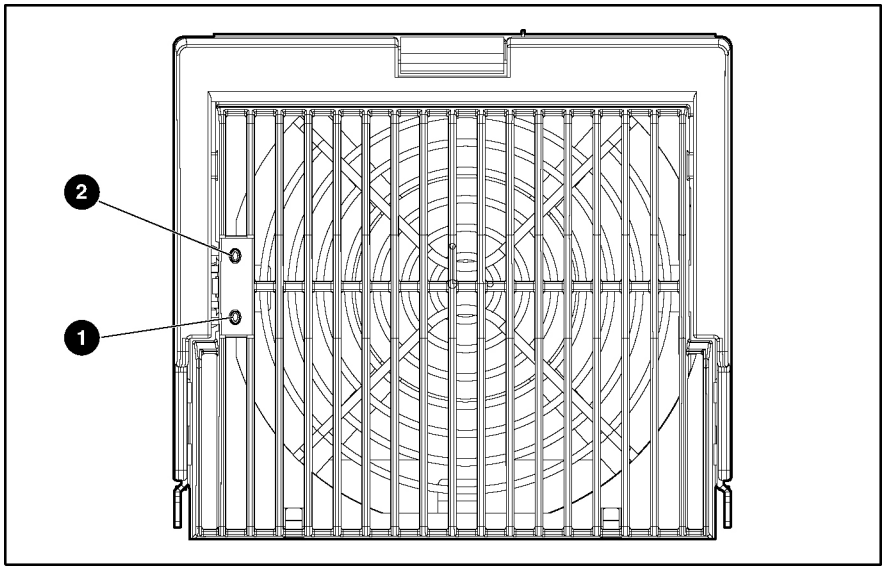

Figure 4-9: Hot-plug power supply LEDs

Table 4-10: Hot-Plug Power Supply LEDs

(1) Power LED Status Green	(2) Fault LED Status Amber	Description
Off	Off	No AC power
Off	On	No AC power to power supply -Or- Power supply failure
Blinking	Off	AC power present System in standby mode
On	Off	Power supply on and working properly
On	Blinking	Power supply current limit exceeded

NIC LEDs

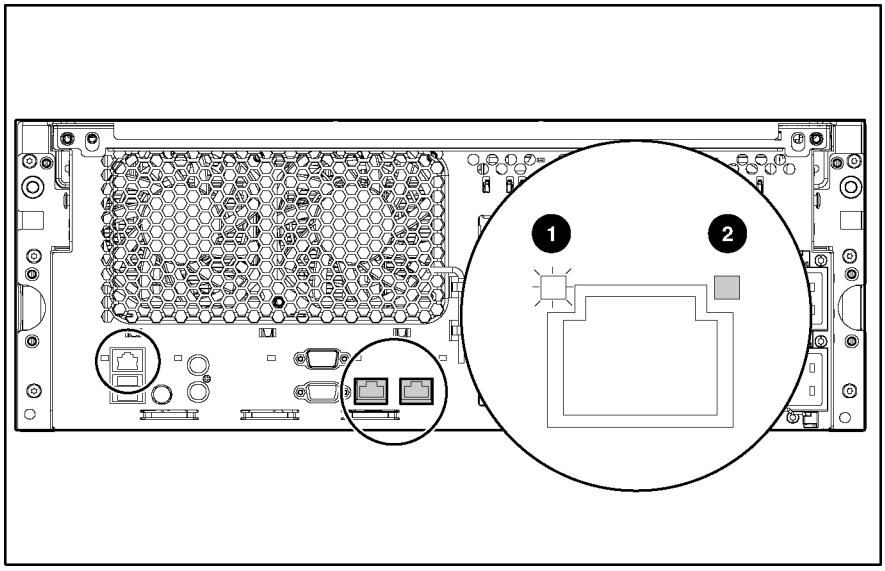

Figure 4-10: NIC LEDs

Table 4-11: NIC LEDs

Item	Description	LED Color	Status
1	Activity LED	Green	On or flashing = network activity
			Off = no network activity
2	Link LED	Green	On = linked to the network
			Off = not linked to the network

Battery-Backed Write Cache Enabler

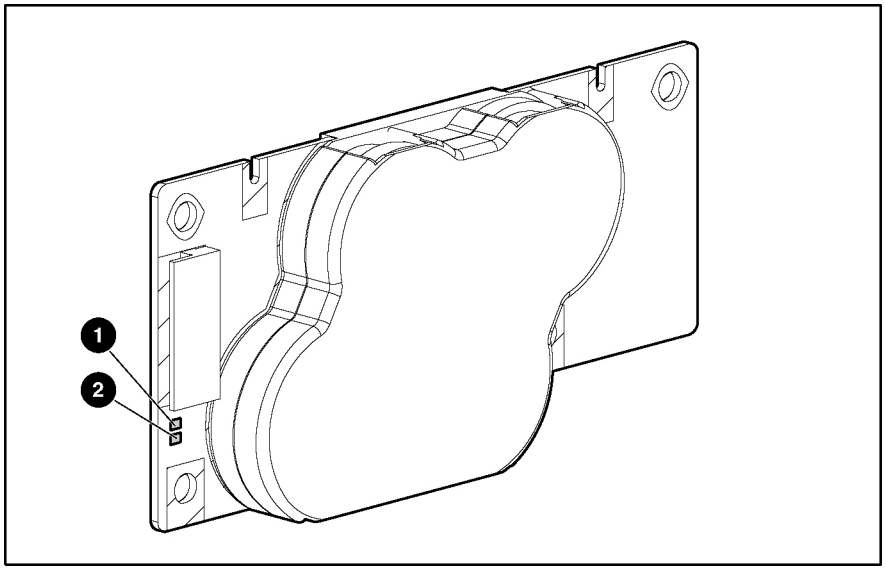

Figure 4-11: Battery-Backed Write Cache Enabler LEDs

NOTE: The battery will take 24 hours to charge for the first time.

Table 4-12: Battery-Backed Write Cache Enabler LEDs

Server Status	LED Color	LED Status	Battery Module Status
Server is on and has normal run time.	Green (2)	On	Fast charging
	Green (2)	Off	Trickle charging
	Amber (1)	On	Short in the connection of one or more of the four button cells within the battery module
	Amber (1)	Blinking	Open in the circuit between the positive and negative terminals of the battery module
	Amber (1)	Off	Battery module status is normal
Server is on and is in the first 30 seconds after power up.	Amber (1) or green (2)	On	Temporary lock-out state; data is lost due to cable being detached
Server is off and is in data retention mode.	Amber (1)	Blinking every 15 seconds	User data held in write cache is being backed up

CAUTION: After the server is powered down, wait 15 seconds and then check the LED illumination pattern before unplugging the cable from the battery module. The LEDs are not visible with the rear access panel on.

- If the amber LED blinks after 15 seconds, do not remove the cable from the battery module. This module is backing up data, and data is lost if the cable is detached.
- If neither LED blinks after 15 seconds, it is safe to remove the cable from the battery module.

When the server is on, review the POST message before plugging or unplugging the cable from the module.

Internal Diagnostic Display

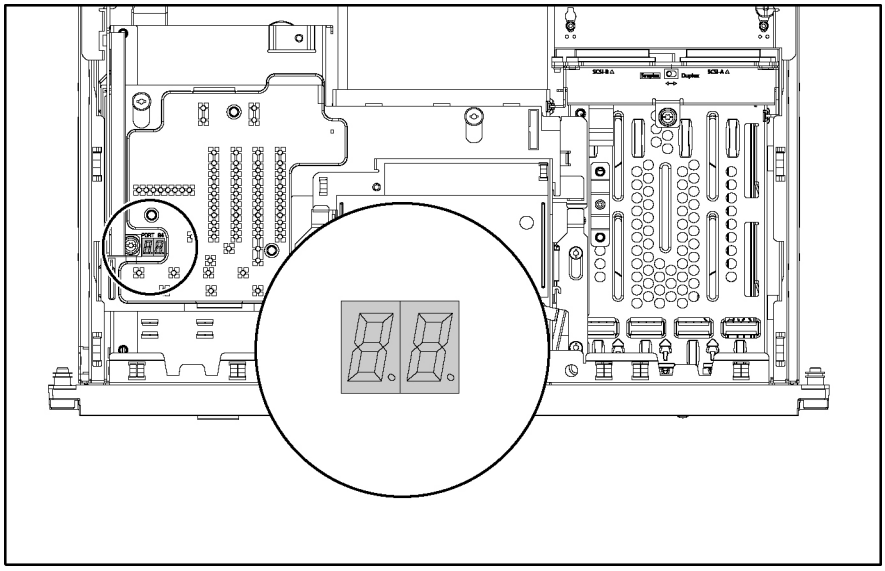

Figure 4-12: Internal diagnostic display LEDs and switches

Table 4-13: Internal diagnostic display switches

Item	Switch 1	Switch 2	Description
Port 84	OFF	OFF	For more information on Port 84, refer to the Port 84 diagnostic codes that occur during the boot process.
Reserved	OFF	ON	N/A
iLO	ON	OFF	For more information on iLO, refer to the *Integrated Lights-Out User Guide.*
5i Plus	ON	ON	For more information on 5i Plus, refer to the *Smart Array 5i Plus Controller User Guide*

NOTE: System defaults to iLO codes when powered off with SW1 and SW2 both off.

System Board Switches

Some server operations, including adding or removing a component or changing a security feature, require that you reconfigure a system switch. If the system configuration is incorrect, the server may not work properly and you may receive error messages on the screen. Setting and checking the system board switches is an important part of the overall troubleshooting process.

The server has three switch banks:

- System maintenance switch (SW3)
- System ID switch (SW4)
- iLO/ Redundant ROM Override switch (SW5)

This section provides figures and tables to identify the locations, positions, functions, and settings for each of these switches.

System Maintenance Switch (SW3)

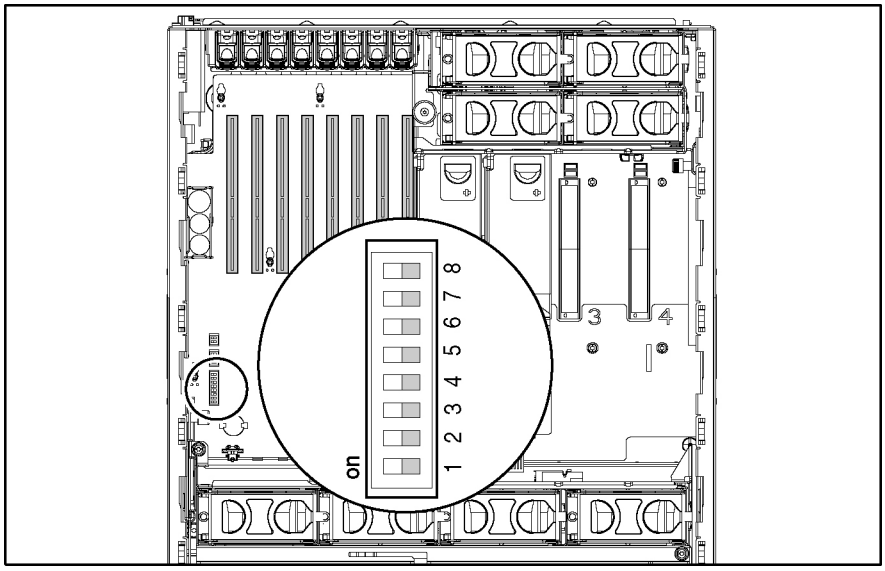

Figure 4-13: System maintenance switch (SW3)

Table 4-14: System Maintenance Switch (SW3)

Position	Default	Function	Description	Settings
1		Reserved		
2	Off	Lock configuration	Enables or disables configuration changes in nonvolatile RAM (NVRAM)	**Open (off)** Configuration can be changed. **Closed (on)** Configuration is locked and cannot be changed.
3		Reserved		
4	Off	Diskette boot override	Enables or disables booting from diskette drive Both settings enable you to read from and write to the diskette after the system completes the boot sequence.	**Open (off)** The diskette drive boot is controlled by the configuration. **Closed (on)** The diskette drive boots regardless of the configuration.

continued

Table 4-14: System Maintenance Switch (SW3) *continued*

Position	Default	Function	Description	Settings
5	Off	Password disable	Enables or disables password protection.	**Open (off)** Power-on password is enabled. **Closed (on)** Power-on password is disabled.
6	Off	Configuration validation	Invalidates nonvolatile RAM (NVRAM) configuration information	**Open (off)** NVRAM is valid. **Closed (on)** NVRAM is invalid, and configuration is lost.
7	Off	Reserved		
8	Off	Reserved		

CAUTION: When maintenance mode is turned on (the maintenance switch is set to on/closed) and the system is powered up, NVRAM configuration is invalidated.

System ID switch (SW4)

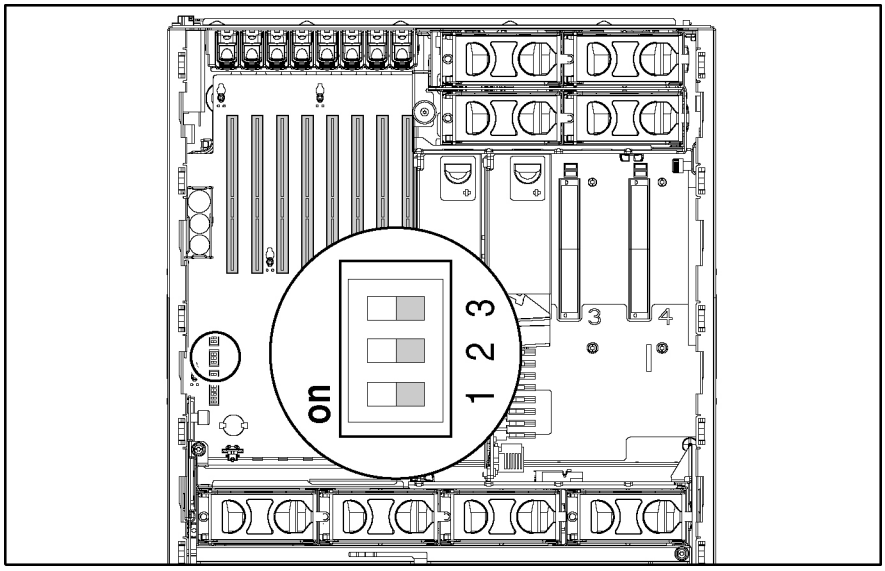

Figure 4-14: System ID switch (SW4)

Table 4-15: System ID Switch (SW4)

Position	Description
1	Reserved
2	Reserved
3	Reserved

iLO/Redundant ROM Override Switch (SW5)

The iLO/ Redundant ROM Override switch (SW5) is a two-position switch that is used for miscellaneous purposes. The iLO security override switch allows the administrator full access to the iLO processor. This access is necessary if the administrator lost their password or if the iLO boot-block needs to be flashed.

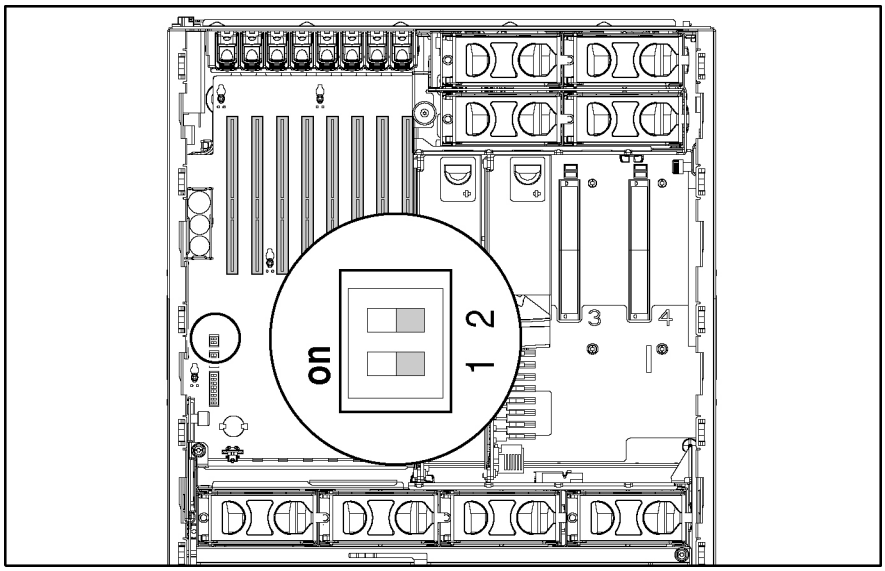

Figure 4-15: iLO/ Redundant ROM Override switch (SW5)

Table 4-16: iLO/ Redundant ROM Override Switch (SW5)

Position	Default	Function	Description	Settings
1	Off	iLO security override	The override allows the administrator full access to the iLO processor.	**Open (off)** Normal **Closed (on)** Override
2	Off	Redundant bootblock select	Forces booting from the redundant bootblock	**Open (off)** Normal **Closed (on)** Redundant bootblock (ROM)

Non-Maskable Interrupt (NMI) Switch

Crash dump analysis is an essential part of eliminating reliability problems such as hangs or crashes in operating systems, device drivers, and applications. Crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

Systems running supported Microsoft operating systems experience a blue screen trap when the operating system crashes. When this happens, Microsoft recommends that system administrators perform a NMI event by pressing a dump switch. The NMI event allows a hung system to become responsive.

The Server is equipped with an NMI switch that, when pushed, performs a memory dump before performing a hard reset.

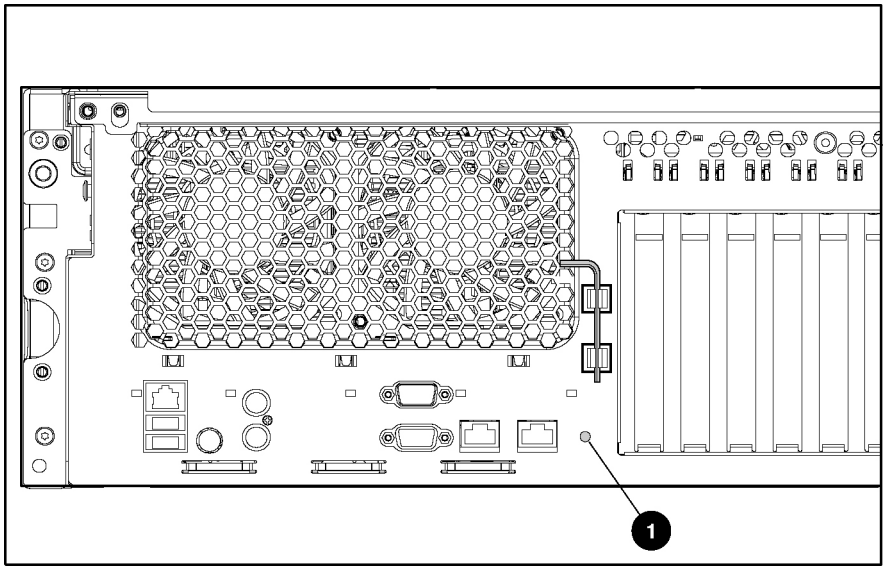

Figure 4-16: Non-Maskable Interrupt (NMI) switch

Rear Unit Identification LED Switch

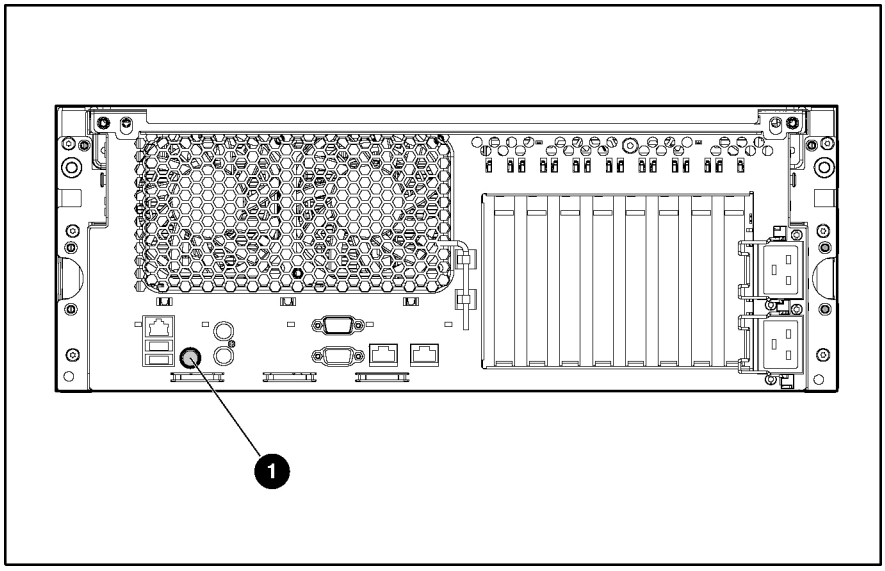

Figure 4-17: Rear Unit Identification LED switch

Table 4-17: Rear Unit ID Switch (1)

LED Status	Description
On (blue)	The switch is activated
Off	The switch is deactivated
Flashing	The system is being remotely accessed

5

Troubleshooting

This chapter provides specific troubleshooting information for the server. Use it to find details about server startup and operation errors.

For information on LEDs and switches specific to the server, refer to Chapter 4, "Server Component Identification."

For a more detailed discussion of troubleshooting techniques, diagnostic tools, error messages, and preventative maintenance, refer to the *HP Servers Troubleshooting Guide* included on the Documentation CD that ships with the server.

WARNING: A risk of personal injury exists from hazardous energy levels. The installation of options and the routine maintenance and service of this product shall be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

If the Server Does Not Start

This section provides systematic instructions on what to try and where to go for help for the most common problems encountered during initial POST. The server must first complete this test each time you power up, before it can load the operating system and start running software applications.

WARNING: A risk of personal injury exists from hazardous energy levels. The installation of options, and the routine maintenance and service of this product shall be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

If the server does not start:

1. Verify that the server and monitor are plugged into a working outlet.
2. Make sure that the power source is working properly:
   a. Check the status using the system power LED.
   b. Verify that the Power On/Standby button was pressed firmly.
3. Make sure that the power supplies are working properly by checking the power supply LEDs.

NOTE: For more information about the location and status of LEDs, refer to Chapter 4, "Server Component Identification." For more information about power, refer to the *HP Servers Troubleshooting Guide*.

4. Check the interlock LEDs on the hood label. If any LEDs are amber, reseat the component.
5. If the system does not complete POST or start loading an operating system, refer to the *HP Servers Troubleshooting Guide*.
6. If the server is rebooting repeatedly, verify that the system is not rebooting due to a problem that initiates an ASR-2 reboot. Some operating systems reboot server when an error occurs. This is the default in Windows Server 2003.
7. Restart the server.

IMPORTANT: If the server does not restart, proceed to the following section, "Diagnostic Steps."

8. Check the server for the following normal power-up sequence to verify that the system meets the minimal hardware requirements and is powered up during normal operations:
   a. The power button LED turns from standby (amber) to on (green).
   b. The fans start up. It is normal for the fans to initially run at full speed and then slow down.
9. Check the monitor for the following messages that verify the system meets the minimal hardware requirements and is powered up during normal operations:
   a. ProLiant logo
   b. BIOS information

c. Copyright information

d. Processor initialization

e. Multi-initiator configuration

IMPORTANT: Select the multi-initiator configuration utility (CRTL-A) only to support HP storage and clustering options.

f. PXE initialization

g. Option ROMs

h. SCSI devices

10. The operating system loads to complete the boot process.

If the server completes POST and attempts to load the operating system, go to the "Problems After Initial Boot" section in this chapter.

Diagnostic Steps

If the server does not power up, or powers up but does not complete POST, answer the questions in Table 5-1 to determine appropriate actions based on the symptoms observed. The flow of questions reflects the usual flow of events during a power-on sequence. A flow chart following this table illustrates the recommended diagnostic steps and decision options.

According to the answers you give, you will be directed to an appropriate secondary table in this section. The table outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions, and references to other sources of information.

Table 5-1: Diagnostic Steps

Question	Action
Question 1: Is the system power LED off?	If no, continue to question 2. If yes, refer to Table 5-2.
Question 2: Is the system power LED green?	If yes, continue to question 3. If no, refer to Table 5-3.
Question 3: Is the external health LED green?	If yes, continue to question 4. If no, refer to Table 5-4.
Question 4: Is the internal health LED green?	If yes, continue to question 5. If no, refer to Table 5-5.
Question 5: Is the monitor displaying information?	If yes, use the POST messages for further diagnosis. Refer to Table 5-6 for details. If no, refer to Table 5-6.

Table 5-2: Is the System Power LED Off?

Answer	Possible Reasons	Possible Solutions
Yes, it is off	The system is not connected to AC power, or no AC power is available.	Be sure that the power cord is connected to the power supply.
	A power supply problem exists. The power supply may not be connected or inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged and fully seated, and then verify that the power supply LED is green when you power up the server. Refer to Chapter 4, "Server Component Identification," for locations and states.
	A broken connection exists between the front panel LED assembly and the removable media board.	Be sure that the power switch cable assembly is inserted properly to the removable media board.
	The front panel LED assembly has failed.	Refer to the *HP Servers Troubleshooting Guide* for further options. If these solutions do not solve the problem, contact an authorized service provider for assistance.

continued

Table 5-2: Is the System Power LED Off? *continued*

Answer	Possible Reasons	Possible Solutions
No		If the system power button LED is amber, press the Power On/Standby button. Refer to Table 5-3.
Note: For LED locations and functions, refer to Chapter 4, "Server Component Identification."		

Table 5-3: Is the System Power LED Green?

Answer	Possible Reasons	Possible Solutions
No, it is off	Power On/Standby button has not been pressed firmly.	Firmly press the power button.
	A power supply problem exists. The power supply may not be connected or inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged, the power supply is fully seated, and the power supply LED is green.
	The system may have experienced a short.	Check for bent connector pins and improperly seated expansion boards.
	The front panel LED assembly has failed.	Be sure that the front panel LED assembly cable is connected to the power backplane.
		If these solutions do not solve the problem, contact an authorized service provider for assistance.
Yes		If the system power button LED is green, refer to Table 5-4.
Note: For LED locations and functions, refer to Chapter 4, "Server Component Identification."		

Table 5-4: Is the External Health LED Green?

Answer	Possible Reasons	Possible Solutions
No, it is amber	One power supply has failed; therefore, power supply redundancy is lost.	Be sure that each installed power supply is securely connected to an AC power source. Locate the amber power supply LED to identify the failed power supply. Contact an authorized service provider for replacement parts and service.
No, it is red	All installed power supplies have experienced a failure.	Remove all AC power from power supplies and reconnect to clear the error condition. Replace the power supply. Contact an authorized service provider for replacement parts and service.
Yes		Refer to Table 5-5 if the external health LED is green.
Note: For LED locations and functions, refer to Chapter 4, "Server Component Identification."		

Table 5-5: Is the Internal Health LED Green?

Answer	Possible Reasons	Possible Solutions
For component failure identification (amber LED), check the hood label.		
No, it is amber	A processor is in pre-failure condition. A DIMM is in pre-failure condition. One memory bank is valid, but another bank is missing a DIMM. One memory bank is valid, but another bank has mismatched DIMMs installed. One memory bank is valid, but another bank has an unsupported DIMM type installed. A redundant fan has failed.	Use internal component failure LEDs to identify: • Missing components • Degraded components • Failed components • Improperly installed components Replace any missing components, reseat all components, and restart the system. If LED failure indicator reappears, replace the failing component. For more troubleshooting information, refer to the *HP Servers Troubleshooting Guide*. For component replacement procedures, refer to the *HP ProLiant DL585 Servers Maintenance and Service Guide* at www.hp.com/support Contact an authorized service provider for replacement parts and service.
No, it is red	A processor has failed. Processor 1 is not installed. A processor is an unsupported type. Processor does not have an associated PPM installed. A PPM has failed. A DIMM has experienced a multibit error. DIMM pairs have mismatched DIMMs. DIMMs are missing. DIMMs are an unsupported type. A required fan has failed. A thermal event has occurred.	Use internal component failure LEDs to identify: • Missing components • Failed components • Improperly installed components • Thermal event Replace any missing components, reseat all components, and restart the system. If LED failure indicator reappears, replace the failing component. For more troubleshooting information, refer to the *HP Servers Troubleshooting Guide*. For component replacement procedures, refer to the *HP ProLiant DL585 Servers Maintenance and Service Guide* at www.hp.com/support Contact an authorized service provider for replacement parts and service.
	A component is not properly seated.	Check the interlock LEDs on top of the front access panel. Be sure that all components are seated securely.

continued

Table 5-5: Is the Internal Health LED Green? *continued*

Answer	Possible Reasons	Possible Solutions
	Interlock problem	Reseat all boards and cables.
	Processor memory board configuration error	Inspect the diagnostic LED panel to determine if one of the processor memory boards has both its PPM and BRD LEDs illuminated. Ensure that processor and PPM are properly installed on the processor memory board.
	PPM or board power fault	Inspect the QuickFind Diagnostic Display panel to determine if one of the PPMs, processor memory boards, or system board has experienced a power fault. Ensure that all components are seated properly. If problem persists, replace the failed component. A PPM failure will be shown by the PPM LED being illuminated on the specific processor memory board. If the processor memory board BRD LED is amber, refer to "Troubleshooting a Failed Processor" later in this chapter. If the I/O power LED is amber, replace the system I/O board.
	Thermal shutdown	If the Therm Trip LED is amber, the system encountered an unexpected thermal shutdown. If one of the processor memory board TEMP LEDs is amber, ensure that the processor heatsink is properly attached, all fans are functioning properly, and that the external environment is within specified parameters. Inspect the iLO logs for any temperature-related warnings.
Yes		If the internal health LED is green, refer to Table 5-6.

Note: For LED locations and functions, refer to Chapter 4, "Server Component Identification."

Table 5-6: Is the Monitor Displaying Information?

Answer	Possible Reasons	Possible Solutions
No	The monitor may not have power. Video may not be connected properly. Non-volatile RAM (NVRAM) may be corrupted. The system ROM and redundant ROM may be corrupted. A processor memory board or HyperTransport link may have failed.	Be sure that the monitor AC power cord is plugged in and that the monitor power button has been pressed. If a video card is installed, be sure that the video cable is properly connected. Verify the video connections. Refer to the *HP Servers Troubleshooting Guide*. Clear NVRAM. Refer to the **Caution** following the table. Refer to Chapter 4 for the correct switch setting. Are there any audible indicators, such as a series of beeps? A series of beeps is the audible signal indicating the presence of a POST error message. Refer to the *HP Servers Troubleshooting Guide* for a complete description of each beep sequence and the corresponding error messages. Refer to the "Troubleshooting a Failed Processor" section later in this chapter. If these steps do not solve the problem, contact an authorized service provider for assistance.
Yes		Video is available for diagnosis. Determine the next action by observing POST progress and error messages. Refer to the *HP Servers Troubleshooting Guide* for a complete description of each POST error message.

CAUTION: Clearing NVRAM deletes your configuration information. Refer to the server maintenance and service guide for complete instructions before performing this operation or data loss could occur.

Problems After Initial Boot

Once the server has passed POST, you may still encounter errors, such as an inability to load the operating system. Use Table 5-7 to troubleshoot server installation problems that occur after the initial boot.

Refer to the *HP Servers Troubleshooting Guide* for more information.

Table 5-7: Problems After Initial Boot

Problem	Possible Reasons	Possible Solutions
System cannot load ProLiant Essentials Foundation Pack.	ProLiant Essentials Foundation Pack requirement not performed.	Check the ProLiant Essentials Release Notes provided in the ProLiant Essentials Online Reference Information on the ProLiant Essentials Foundation Pack.
	CD-ROM drive is not properly seated.	Reseat CD-ROM drive.
	Insufficient memory is available.	A rare Insufficient Memory message may display the **first** time ProLiant Essentials is booted on certain unconfigured systems. Cold-boot the machine with the ProLiant Essentials Foundation Pack inserted in the CD-ROM drive to correct the problem.
	Existing software is causing conflict.	Run the System Erase Utility. Read the **Caution** at the end of the table. Refer to the instructions in the *HP Servers Troubleshooting Guide*.
ProLiant Essentials fails during installation.	Error occurs during installation.	Follow the error information provided. If it is necessary to reinstall, run the System Erase Utility. Read the **Caution** at the end of the table. Refer to the instructions in the *HP Servers Troubleshooting Guide*.
	CMOS is not cleared.	Run the System Erase Utility. Read the **Caution** at the end of the table. Refer to the instructions in the *HP Servers Troubleshooting Guide*.

continued

Table 5-7: Problems After Initial Boot *continued*

Problem	Possible Reasons	Possible Solutions
Server cannot load operating system.	Required operating system step was missed.	Follow these steps: 1. Note at which phase the operating system failed. 2. Remove any loaded operating system. 3. Refer to the operating system documentation. 4. Install the operating system again.
	Installation problem occurred.	Refer to the operating system documentation and to the ProLiant Essentials Release Notes on the ProLiant Essentials for Servers CD. Run RBSU and check the OS Selection menu.
	Problem was encountered with the hardware you have added to the system.	Refer to the documentation provided with the hardware. Refer to the User Guide to identify correct SCSI bus cabling configuration for the unit.
	Problem was encountered with hardware added to a new configure-to-order system (where available).	You must complete the factory-installed operating system software installation before adding new hardware to the system. Be sure you are following the instructions provided in the *Factory-Installed Operating System Software Installation Guide*. Remove the new hardware and complete the software installation. Then, reinstall the new hardware.

CAUTION: The System Erase Utility causes loss of all configuration information, as well as loss of existing data on all connected hard drives. Please read the appropriate section and the associated warning in the *HP Servers Troubleshooting Guide* before performing this operation.

Refer to the *HP Servers Troubleshooting Guide* for the following:

- Information you need to collect when diagnosing software problems and to provide when contacting support
- Instructions on how to upgrade the operating system and its drivers
- Information about available recovery options and advice on minimizing downtime

Troubleshooting a Failed Processor

The AMD HyperTransport link architecture links multiple processors. When a processor failure occurs, the root cause of the problem can be either a failed HyperTransport link or a failed processor.

A failed processor or failed HyperTransport link causes the system to hang at POST without video.

Perform the steps outlined in the following sections to isolate a failed component in a 2 or 4-processor memory board configuration.

Two-Processor Memory Board Configuration

In a 2-processor memory board configuration, processor memory boards are installed in slot 1 and slot 2. Since the system does not boot with only one processor board, one or two extra, known-good boards (along with processors) may be required to troubleshoot.

IMPORTANT: Be sure that the processor memory board in slot 2 has DIMMs installed. For more information on memory population guidelines, refer to the "Memory Options" section in Chapter 2.

1. Reseat both processor memory boards and power up the server. If this does not resolve the problem, proceed to the next step.
2. Replace the processor memory board in slot 2 with a known good board and power up the server.
3. If this does not resolve the problem, replace the processor memory board in slot 2 with the original processor board and replace the processor board in slot 1 with the known good processor board.
4. If this does not resolve the problem, replace the original processor boards in slot 1 and slot 2 with two known good processor boards. If the system still fails to boot, replace the system board.

Four-Processor Memory Board Configuration

In a 4P configuration, all processor memory board slots are populated.

1. If the system fails to boot, remove the processor memory boards in slot 3 and slot 4 to attempt booting with 2P.
2. If this works, one or both of the processor memory boards removed from slots 3 and 4 could be bad.
3. Go through the steps in the 2P description above to isolate the failed components.
4. If this does not resolve the problem, replace the processor memory boards in slots 1 and 2 with the two boards that were removed from slots 3 and 4.
5. If this works, one or both of the processor boards originally in slots 1 and 2 could be bad. Go through the steps in the 2P description above to isolate.
6. If all processor boards work, run two at a time and 4P still does not work, a link on the system board is probably bad. Replace the system board.

Other Information Resources

Refer to the following additional information for help.

Table 5-8: Troubleshooting Resources

Resource	Description
HP Servers Troubleshooting Guide	This is a resource for obtaining troubleshooting information that is beyond the scope of this document. It includes general hardware and software troubleshooting information for all ProLiant servers, a complete list of error messages along with explanations of probable causes, and a list of remedial measures. This guide resides on the Documentation CD that ships with the server. To be sure that you have the most up-to-date copy of the *HP Servers Troubleshooting Guide*, visit the product website at www.hp.com.
Other Online Documentation	Product Bulletin QuickSpecs OS Support Matrix

For additional information on warranties and service and support upgrades (Care Pack services), visit the product website at www.hp.com.

6

Specifications

Table 6-1: Server Specifications

Feature	Units
Dimensions	
Height	17.5 cm (6.88 in)
Depth	69.2 cm (27.25 in)
Width	46.3 cm (19.0 in)
Weight	30.8 kg, minimum (68 lb, minimum) 44.5 kg, maximum (98 lb, maximum)
High-line voltage requirements	
Rated input voltage	180 V to 264 V
Rated input frequency	47 Hz to 63 Hz
Rated input current	6 A
Low-line voltage requirements	
Rated input voltage	90 V to 132 V
Rate input frequency	47 Hz to 63 Hz
Rated input current	12 A
Power supply output power	
Rated steady-state power	800 W
Maximum peak power	800 W
Temperature range	
Operating	10° to 35°C (50° to 95°F)
Non-operating	-30° to 60°C (-20° to 140°F)
Relative humidity (non-condensing)	
Operating	20% to 80%
Non-operating	5% to 90%
Maximum wet bulb temperature	38.7°C (101.7°F)
Heat dissipation	3900 BTU/Hr

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